BEST AVAILABLE COPY

C 3175-1

NOVEMBER 1981

FOREST INDUSTRIES

LOGGING/PULPWOOD/FORESTRY/LUMBER/PANELS

Logger's efficien[illegible] pays off in three-side skyline show[illegible]

FOREST INDUSTRIES *1981 Volume 107 Number 12*

NOVEMBER

Woods | Mills

28
Timber buyers get two-year extension
Forest Service moves to prevent some defaults on timber sale contracts by extending certain harvest schedules

39
When interest rates fall, what outlook is likely for U.S. wood industry?
Richard Reid of Western Timber Assn. speculates on the industry's future after interest rates get back to 'normal'

42
A logical examination of Redwood National Park
Leaving out the emotional claims, just how much did this park really cost U.S. taxpayers, local (jobless) residents?

Cover story, page 24

24
Logger understands sawmill's log needs
Gene Pollman of Medford, Ore., uses mill experience to cut good logs

30
Scandinavian logging machines on display
North Americans can learn from Nordic machines at a Swedish equipment show

40
Experience, equipment keep logger working
Harris & Son of Pomaria, S.C., switched to tree-length, mechanized operation

44
Timber buyers contend with tough road specs
Bohemia Inc. of Eugene, Ore., had to develop new ground rules to deal with BLM, Forest Service road regulations

46
Varied terrain makes logging job interesting
Supplying Evans Products mills at Lillooet, B.C., requires logging steep slopes and plateaus in wet and dry areas

48
Mechanized loggers rate highest in productivity in Minnesota study
Mechanical felling, chain-saw delimbing and grapple skidding won top rating in survey of harvest output

26
Process control system updated at small-log mill as log quality changes
Second-generation system installed at Boise Cascade's La Grande, Ore., sawmill to handle dead, burned logs

page 44

32
Sawmill modernized after fire destroyed most of its machines
After a fire gutted American Can's Bellamy, Ala., mill, new and better equipment replaced the old machines

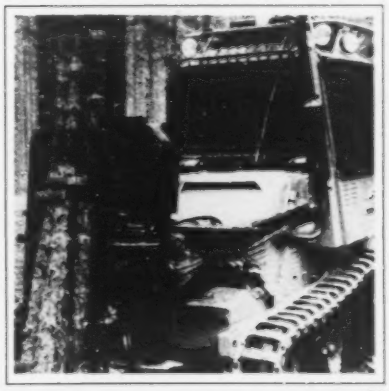
Energy

57
Swedish bark combustor installed at B.C. mill

The newly inaugurated combustor at Gorman Bros. Lumber Ltd.'s mill in Westbank, B.C., produces 16 million Btu/hr, saves $150,000/yr in fuel costs

59
'New breed' of loggers harvest firewood too; aim for total utilization

Total Tree Products Co. in Harbor Springs, Mich., have found a good byproduct in firewood. A La Font firewood processor is the key



page 30

Departments

5 **Comment**

7 **Conversation**

9 **Washington**

11 **For the Record**

15 **Meetings**

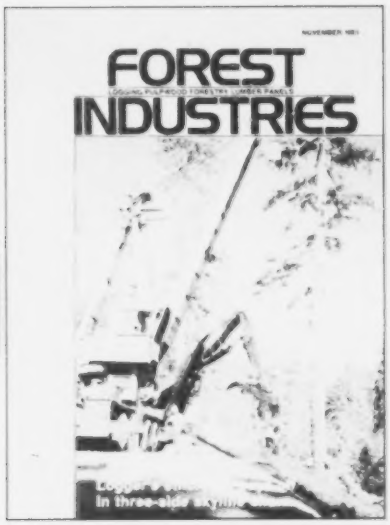
17 **Letters**

57 **Industrial Wood Energy**

63 **Equipment**

67 **Industry News**

72 **Newsmakers**



Herbert G. Lambert: Editor
David A. Pease: Executive Editor
Richard W. Bryan: Associate Editor
Ted Blackman: Associate Editor
Mary Lou Corlett: Managing Editor
Luke Popovich: Washington Correspondent
Peter A. Tucker: Art Director
Janet A. Duncan: Technical Artist

•

Norman T. Rae: Publisher

PUBLISHING OFFICE
500 Howard Street
San Francisco, Calif. 94105
Telephone: (415) 397-1881
Telex 278273
Cable: Milfreepub

REGIONAL EDITORIAL OFFICES
P.O. Box 1371
Pineville, Louisiana 71360
Telephone (318) 640-0198

64646 McGrath Rd.
Bend, Oregon 97701
Telephone (503) 388-4348

1100 17th St. N.W., Suite 710
Washington, D.C. 20036
Telephone: (202) 328-8413

SUBSCRIPTIONS: Sent without charge to management, production, technical, engineering maintenance and other supervisory personnel in logging, pulpwood and forest management firms; and in firms manufacturing lumber, plywood, board, and pulp in the U.S./Canada. To all others there is a subscription charge of $30 a year in the U.S./Canada. All subscriptions in other countries: $40 a year, except Europe and the Mediterranean, $50 (air service included). Single copy $3, except May Annual Lumber Review & Buyer's Guide, $15. Available in microform through Bell & Howell and University Microfilms.

Requests, subscription orders and address changes must show name, job or position of individual, name and location of mill, plant or office where employed, and exact business conducted at this location. Send subscription correspondence to Circulation Department, FOREST INDUSTRIES, 500 Howard Street, San Francisco, Calif. 94105. For address change, include label from recent issue.

FOREST INDUSTRIES (USPS 205-060) is published monthly except May when semi-monthly by Miller Freeman Publications, 500 Howard Street, San Francisco, Calif. 94105. Second class postage paid at San Francisco, Calif., and at additional mailing office. POSTMASTER: Please send Form 3579 to FOREST INDUSTRIES, 500 Howard Street, San Francisco, Calif. 94105.

A hard look at Redwood Park—for once, leaving out emotion

Emotional claims win votes. Realities often demolish claims, but too late. Setting up Redwood National Park has cost almost $1 billion, and not all bills are paid

By HERB LAMBERT
Editor

SAN FRANCISCO, CALIF.—Budget overruns in government construction and defense contracts generate flak—when the people find out about them. Federal budget cuts in certain areas also generate flak—when exposed.

Taxpayers are irate. Congressmen, depending on which side of the aisle they sit or which political philosophy they espouse, express horror. They call for investigations. But since Congress holds the purse strings, Congressmen must look in the mirror.

Some legislators, perhaps many, who voted for the Redwood National Park (and later, its expansion) no longer serve in Washington. Others still occupy their old—or perhaps new—desks. It should be worth a few minutes of their time, and the time of some reporters, editors and cost-conscious as well as cost-flouting environmentalists, to scan a recent White Paper memorandum on the park. The memorandum compares original claims with current realities.

The White Paper, based on data compiled by Arcata Corp., Menlo Park, Calif., is divided into two fundamental parts: creation of the park in 1968 and its expansion 10 years later. The analysis, for that is precisely what it is, focuses on three issues:

- Estimates of the amount of just compensation that the federal government would be required to pay to owners for private land taken for the park;
- Forecasts of the number of jobs lost in the timber industry and the implications of those losses to local, state and federal governments; and
- Assumptions regarding the extent to which tourism would increase as a result of creating and expanding the park, and the associated jobs created as

Creation of the Redwood National Park, 1968
The claims and the realities

Issue	Environmentalists	Government	Landowners	Others	The realities
Timberland acquisition costs	72,000-acre park for $100 million.	30,000-acre park for $92 million	30,000-acre park for two to three times greater than $92 million.		30,000-acre park for $306,016,344 with timberland acquisition costs alone of $205 million.
Job losses	None. Tourism and increased harvest on Six Rivers would offset the losses.	Probable net gain due to increased tourism, land exchange and increased harvesting on Six Rivers.	Loss will exceed 2,000 unless Six Rivers allowable cut is greatly increased; tourism will not create significant employment.	Arthur D. Little forecast that 498 jobs lost would be offset by increase in tourism.	718 direct jobs lost; 1,300 regional jobs lost; 2,039 total jobs lost; 15% unemployment rate.
Tourism	Endorsed Arthur D. Little report, "There will be such an outpouring of visitors that tourism rather than timber will become the dominant industry."	950,000 visitor days to a new redwood park by 1973.	Cold and damp climate and great distance from metropolitan centers will combine to limit tourist growth.	Arthur D. Little forecast 250,000 added visitor days by 1973; 1,600,000 added visitor days by 1973.	35,500 visitor days in 1975: • 5% of A. D. Little estimate. • 4% of government estimate.

offsets to lost timber jobs.

Data on these three issues are summarized in the accompanying charts.

The 21-page memorandum covers each item in considerable detail, using records of hearings, testimony and statements by experts and disinterested people. It traces much of the financial activity required, some of which is still taking place.

This narrative explanation of the summaries in the charts offers more information.

For example, the Redwood National Park ranks 29th of 43 U.S. national parks in visitors. It is, without question, by far the costliest park ever created.

As has been stated in past years in FOREST INDUSTRIES, and as people familiar with redwoods know, a national park was not necessary "to save the last redwoods." Park proponents often used that claim in their campaign.

A major subject in the long controversy, particularly in the later expansion phase, was the "Tall Trees" grove. They grew on private land, but are now within the park. While visitors to these specimens have been relatively few in number, officials apparently are considering limiting access to the grove: 2,000 visitors per summer is too many. The people visiting may adversely affect the spectacular redwoods.

Neither side in the controversy had a crystal ball, and no prognosticator is perfect. Still, it is interesting to note that the assorted claims by park proponents—back then and since then—have proven to be far off target.

Such claims, many linked with emotional appeals, swayed votes. Excerpts from these claims, originally voiced at various hearings, are especially interesting in light of today's facts.

This commentary on the White Paper should not be taken to imply there should never have been a Redwood National Park. In the writer's opinion, the park should exist. Its proper size, of course, is debatable. But before the park was created, there was already reservation (preservation, if you prefer) of prime redwood groves in California's state parks. True, the Tall Trees grove was not in public ownership. Arrangement for buying those trees, or for some special access to them, might well have been considered.

The Redwood National Park exists. Further contemplation is moot.

However, a park as big and costly as this one was not needed. That cost is now not far below $1 billion and the books have not yet been closed on the transaction. And they surely have not been closed on the park's financial fallout in the redwood region.

Congressmen and others who are sensitive to costly outlays and budget cuts would do well to familiarize themselves with what was wrought in the case of the Redwood National Park. They should especially note the various claims that were voiced about the need for the park and the results or circumstances its creation would generate—but did not.

More importantly, attention should be paid to the probable final cost in dollars versus the claimed benefits and results. Such comparison would unquestionably suggest the importance of a cost-benefit analysis in natural resource decisions. ■

Redwoods. They offer both magic and controversy, fact and fiction. Few, if any, species are as emotional a subject, as durable a product.

Expansion of the Redwood National Park, 1978

The claims and the realities

Issue	Environmentalists	Government	Landowners	Others	The realities
Timberland acquisition costs	77,000-acre park for $130 million; or 48,000-acre park for $237 million.	48,000-acre park for $359 million.	48,000-acre park for $600 million to $750 million.	48,000-acre park for: • Over $450 million. • Over $500 million. • Total cost of $1.1 billion for park.	$600 million to $1 billion.
Job losses	Minimum and inevitable; in any case, increased tourism would soften adverse impact.	611 direct jobs, 1,368 in total offset by 820 high-probability new jobs; cost of $40 million to taxpayers for displaced workers.	1,220 direct job losses; 2,700 regional jobs lost.	Over next 20 years, job income of $520 million and regional tax loss of $192 million; an expansion rate of this scale would result in unemployment rate of 19%.	870 direct jobs lost and 2,500 regional jobs lost; more than 2,500 persons have been receiving benefits under Title II of the Act creating the park; best current estimate of costs for displaced workers is $70 million.
Tourism	Expect great influx of tourists.	"Tourism is going to be a growth industry for that area, particularly with expansion of the park."	Park expansion will not boost tourism; adding acres will not increase the number of tourists.	You cannot change climate or geography; people like to go where the climate is hospitable.	Visitor days are still under 40,000; attendance has grown 1% since the expansion three years ago.

Larger, mechanized loggers score highest productivity

Survey of Minnesota operators shows tree-length logging with mechanical felling, grapple skidding and chain saw delimbing is most productive combination

By KIP BOLSTAD
and STEVEN A. SINCLAIR

ST. PAUL, MINN.—Rapidly-increasing costs of equipment and labor experienced in today's timber harvesting industry place productivity high among the concerns of the logging manager. Increasing productivity of the logging operation can mean the difference between profit and bankruptcy. Productivity improvements resulting from mechanization and tree-length harvesting have been documented in a recent study of Minnesota loggers[1]. Survey data may prove helpful in making a comparison with individual operations.

Production information obtained from 141 logging operations showed individual company productivity ranged from 0.059 cord per man-hour to 2.261 cords per man-hour.

The most productive mixture of harvesting equipment was used by three firms to produce tree-length material by mechanical felling, chain saw delimbing and grapple skidding. These operations had a mean production rate of 1.390 cords per man-hour.

The most productive felling/skidding combination of equipment was used by 27 firms and consisted of mechanical felling and rubber-tired grapple skidders. This combination resulted in a mean production rate of 0.952 cord per man-hour.

The survey group was broken down into size and skidding method classifications, with the averages obtained as follows:

- Production under 1,000 cords per year, 49 companies averaging 0.336 cord per man-hour.
- Production over 1,000 cords per year, 92 companies averaging 0.748 cord per man-hour.
- Firms skidding tree length, 58 averaging 0.757 cord per man-hour.
- Firms skidding full trees, 32 averaging 0.751 cord per man-hour.
- Firms forwarding shortwood, two averaging 0.425 cord per man-hour.

Compare these figures with those

TABLE 1—Summary of productivity by annual production volume for all firms

Annual volume (cords)	Mean Productivity	Standard deviation	Median productivity	Range	Number of firms	Significance*
	Cords per man-hour					
Group 1: Less than 1,000	.336	.301	.243	.059-1.418	49	
Group 2: Greater than 1,000	.748	.418	.655	.081-2.261	92	
1,000	.336	.301	.243	.059-1.418	49	A
1,000-1,999	.533	.401	.425	.081-1.739	17	B
2,000-2,999	.563	.280	.515	.250-1.140	18	B
3,000-3,999	.628	.198	.632	.292-1.057	15	B
4,000-4,999	.897	.464	.697	.260-1.722	12	C
5,000	.980	.439	.953	.320-2.261	30	C
All firms	.604	.428	.500	.059-2.261	141	

TABLE 2—Duncan's Multiple Range Test for mean production per man-hour
(Firms over 1,000 cords annual production)

Combination		Mean production per man-hour, cords	Standard deviation	Number of firms	Significance
Felling	Skidding				
Mechanical	Rubber-tired cable	.567	.312	12	A
Chainsaw	Rubber-tired cable	.690	.382	52	A
Mechanical	Rubber-tired grapple	.952	.454	27	B
Entire population		.751	.419	91	

*Means with the same letter are not significantly different at the .10 level according to Duncan's Multiple Range test.

TABLE 3—Mean production per man-hour for 10 types of harvesting equipment combinations
(Firms over 1,000 cords annual production)

Type of equipment				Mean production per man-hour, cords	Standard deviation	Number of firms
Fell	Skid	Limb	Buck			
Chainsaw	Cable	Chainsaw	Treelength (not bucked)	.465	.197	3
Mechanical	Cable	Chainsaw	Chainsaw	.581	.345	7
Chainsaw	Cable	Chainsaw	Chainsaw	.677	.382	37
Chainsaw	Cable	Chainsaw	Slasher	.688	.347	6
Mechanical	Grapple	Chainsaw	Chainsaw	.695	.155	5
Mechanical	Grapple	—Processor—		.698	.429	5
Mechanical	Cable	Chainsaw	Treelength (not bucked)	.733	.213	3
Chainsaw	Cable	—Processor—		.770	.337	3
Mechanical	Grapple	Chainsaw	Slasher	.875	.317	9
Mechanical	Grapple	Chainsaw	Treelength (not bucked)	1.390	.309	3
Entire Population				.718		81

produced by some earlier surveys. In 1944 the productivity of southern pulpwood labor was only two cords per man-day[2]. In 1966 the productivity of 12 company logging operations in the South ranged from 2.16 to 6.99 cords per man-day with a mean production rate of 3.72 cords per man-day[3]. In 1971 the productivity of 26 northeastern logging firms ranged from 2.6 to 10.3 cords per man-day with a mean production rate of 4.72 cords per man-day[4].

As noted, usable information was secured from 141 logging firms. These were divided into two groups, based on total production volume registered in 1979.

Group 1: under 1,000 cords

The 49 firms in this category produced annual volumes ranging from 31 to 950 cords with a mean volume of 415 cords per firm and a median volume of 300 cords per firm. The majority of these companies used chain saws and rubber-tired cable skidders.

Only eight firms in Group 1 produced strictly one roundwood product, with the remaining companies producing two, three or four different products. Production rates for all 49 firms averaged 0.336 cord per man-hour and ranged from 0.059 to 1.418 cords per man-hour. The median production rate was 0.243 cord per man-hour.

Of these companies, 37 reported they skidded tree length and produced primarily shortwood products. Production rates for these firms averaged 0.345 cord per man-hour. Three firms which skidded tree length and produced tree-length products averaged 0.833 cord per man-hour in comparison to eight shortwood operations which averaged 0.175 cord per man-hour. One firm skidded full trees and produced primarily shortwood products.

Group 2: over 1,000 cords

The 92 firms in Group 2 produced annual volumes ranging from 1,021 cords to 24,320 cords with a mean volume of 4,864 cords per firm and a median volume of 3,566 cords per firm annually. Although the majority of these companies still relied heavily on the chain saw and rubber-tired cable skidder, there were several fully-mechanized operations using equipment such as feller-bunchers, grapple skidders and roadside processors.

The group included 58 firms which skidded tree length, 51 of which produced primarily shortwood products and seven of which produced tree-length products. There were 32 firms which skidded full-tree, 26 producing shortwood products and five producing tree-length products. One firm produced strictly whole-tree chips. Only two firms skidded (or forwarded) shortwood.

Only 10 firms in Group 2 produced strictly one roundwood product, while the remaining firms reported producing between two and seven different products. Production rates for all 92 firms averaged 0.748 cord per man-hour. The median was 0.655 cord per man-hour.

Table 1 gives a summary of mean productivity for all 141 firms broken down by annual volume.

Table 2 shows the results of an analysis of mean productivity for Group 2 firms placed into three felling/skidding combinations. All except one firm, which used a forwarder, were placed into one of these three groups based on the equipment used in felling and skidding operations.

A Duncan's Multiple Range test was run for these firms and, as Table 2 shows, the firms that reported using mechanical felling and rubber-tired grapple skidders had significantly higher productivity than did firms using mechanical or chain saw felling and rubber-tired cable skidders.

The results of a ranking of productivity by type of equipment mix for firms in Group 2 are presented in Table 3. This ranking considers only 10 equipment mixes and does not completely consider sequence of operations or form of product skidded. ■

THE AUTHORS are, respectively, Graduate Research Assistant and Assistant Professor, Department of Forest Products, University of Minnesota, St. Paul, Minn.

Literature cited

[1] *Sinclair, S.A., and Bolstad, Kip. Staff paper: Department of Forest Products, University of Minnesota. 37pp. 1981.*

[2] *Tracewitz, O.G. The Unit, Southern Pulpwood Conservation Assn., No. 104, p. 18. 1965.*

[3] *Rolston, K.S. Pulpwood Production and Saw Mill Logging, Vol. XV (8):10-11. 1967.*

[4] *American Pulpwood Assn. Technical Release No. 72-R-33. American Pulpwood Assn. New York. 1972.*

IC 3175-1

JANUARY 1982

FOREST INDUSTRIES

LOGGING/PULPWOOD/FORESTRY/LUMBER/PANELS

IMPACT '82

BEST AVAILABLE COPY

FOREST INDUSTRIES *1982 Volume 109 Number 1*

JANUARY

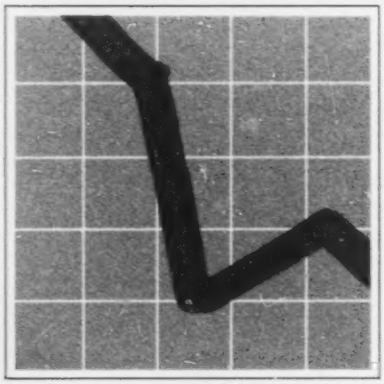
IMPACT '82

41
Prefab bridge keeps timber access road open to loggers
Portable bridge replaced rotting log stringer span on forest road on Warm Springs Indian Reservation in Oregon

46
Family members work together on mechanized shortwood logging jobs
R.L. Womack of Sikes, La., his sons and cousins harvest pulpwood with a feller-buncher, skidder and landing machine that loads, bucks and delimbs stems

42
Rebuilt mill cuts more lumber with a smaller crew
Westvaco Lumber's Summerville, S.C., mill was rebuilt with three goals: higher production, improved recovery, lower labor costs. It met its goals

24
Bad times likely to stay a while for U.S. housing
1980's predictions of improvement in 1981 didn't pan out, and the outlook for '82 isn't all that bright despite year-end drop in interest rates



Cover story, page 24

26
South's Third Forest isn't growing fast yet, but concept lives on
Southerners are not reforesting fast enough to meet Third Forest goals; lack of investment incentives cited

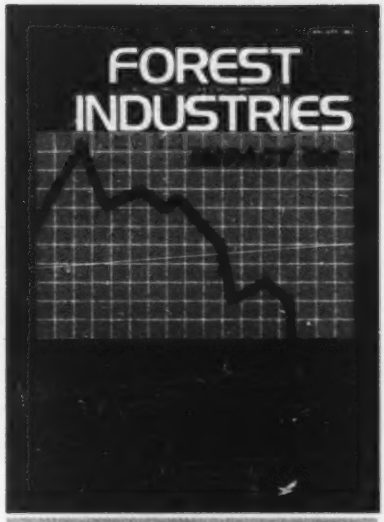
28
West's timber supply depends on land planning for national forests
For several decades, the West must depend on national forest timber. Forest Service can make or break the economy in Northwest's wood belt

30
Endless debate goes on over how and whether to use the public lands for best benefit to people
Symposium on access to public lands surprised no one: positions on using or saving U.S. public lands haven't changed, and aren't likely to

32
Starved for profits? Look overseas for good wood markets
U.S. wood exports could double by 2000, thanks to rising demand in European, Pacific Rim nations

34
Seer expects 1982 will bring recovery to housing industry
Fearless Luke Popovich says that conditions can't get worse, so the time has come to expect a rebound in American homebuilding activity

36
Forest firms spend more than $1.2 billion on capital projects
Despite hard times, North American forest products firms are spending plenty to upgrade mills, build new ones



Energy

57
Drying sawdust to fire brick kiln saves fuel and improves product

Georgia-Merry Companies Inc., Augusta, Ga., has installed a woodwaste processing system to supply fuel to tunnel kilns

58
First U.S. large-scale biomass gasification unit soon to be on line

A California State office building will be heated and cooled by an Energy Products of Idaho system that converts biomass to low-Btu combustible gas

page 42

Departments

5
Comment

9
Conversation

11
Washington

13
For the Record

17
Letters

57
Industrial Wood Energy

59
Equipment

61
Industry News

65
Meetings

67
Books/Bulletins

68
Newsmakers

Herbert G. Lambert: Editor
David A. Pease: Executive Editor
Mary Lou Cerlett: Managing Editor
Ted Blackman: Associate Editor
Peter L. Ogle: Associate Editor
Luke Popovich: Washington Correspondent
Peter A. Tucker: Art Director
Janet A. Duncan: Technical Artist

Norman T. Rae:
Publisher/Editorial Director

PUBLISHING OFFICE
500 Howard Street
San Francisco, Calif. 94105
Telephone: (415) 397-1881
Telex 278273
Cable: Millreepub

REGIONAL EDITORIAL OFFICES
Suite 530
2700 Cumberland Parkway, N.W.
Atlanta, Georgia 30339
(404) 432-3196

733 S.W. Oak St.
Portland, Oregon 97205
(503) 222-1313

1100 17th St. N.W., Suite 710
Washington, D.C. 20036
Telephone: (202) 328-8413

SUBSCRIPTIONS: Sent without charge to management, production, technical, engineering maintenance and other supervisory personnel in logging, pulpwood and forest management firms; and in firms manufacturing lumber, plywood, board, and pulp in the U.S./Canada. To all others there is a subscription charge of $30 a year in the U.S./Canada. All subscriptions in other countries: $40 a year, except Europe and the Mediterranean, $50 (air service included). Single copy $3, except May Annual Lumber Review & Buyer's Guide, $15. Available in microform through Bell & Howell and University Microfilms.

Requests, subscription orders and address changes must show name, job or position of individual, name and location of mill, plant or office where employed, and exact business conducted at this location. Send subscription correspondence to Circulation Department, FOREST INDUSTRIES, 500 Howard Street, San Francisco, Calif. 94105. For address change, include label from recent issue.

FOREST INDUSTRIES (ISSN 0015-7430) is published monthly except May when semi-monthly by Miller Freeman Publications, 500 Howard Street, San Francisco, Calif. 94105. Second class postage paid at San Francisco, Calif., and at additional mailing office. POSTMASTER: Please send Form 3579 to FOREST INDUSTRIES, 500 Howard Street, San Francisco, Calif. 94105.

Offshore markets bring relief to a profit-starved industry

Rising world demand for wood, notably in Europe and the Pacific Rim, makes the export market an inviting target for expansion. U.S. exports could double by 2000

By MARY LOU CORLETT
Managing Editor

PORTLAND, ORE.—Faced with a crippled housing industry and a recession that shows no signs of ending soon, many U.S. forest products companies are relying on the export market as a means of cushioning financial blows.

Since 1979, profits for U.S. forest products companies have dropped nearly 75%, so it's not surprising to see heightened interest in exports. Traditionally, U.S. producers have entered the export market when the domestic market is down and then have pulled out when the U.S. market is up.

It appears that in the current downturn, however, industry is becoming more committed to the export market, viewing it as a complement to, not a replacement for, domestic sales. Companies and associations are scrambling to establish overseas offices and organize market development programs because they anticipate long-term—and substantial—payoffs.

Already some companies are seeing those payoffs. Crown Zellerbach, for example, created an international marketing division two years ago, establishing offices in Tokyo, Brussels, London and Mexico City and finding agents in several other cities. The division is growing 20% annually, a figure nearly 10 times that of CZ as a whole.

The export market's appeal lies in the fact that world demand for wood products is rising rapidly. Although some overseas markets aren't as healthy as they were a year or two ago—due primarily to Japan's own housing slump and Europe's recession—analysts expect renewed vigor sometime this year. The United Nations Food and Agricultural Organization (FAO) has projected that world wood markets will double between 1975 and 2000.

The United States, currently a net importer of wood, has an export market share of about 18%. Last year it shipped $3.6 billion worth of wood overseas. Nonetheless, it comes in a poor second to Canada, which produces nearly a third of the wood imported by the rest of the world. About 30% of that volume is shipped to the U.S.

Other major wood producers are the U.S.S.R., Sweden, Malaysia, Finland and Indonesia. (See Table 1 for a breakdown of softwood lumber exports.)

How to improve share of market—and thus boost profits—was one of the main topics at an wood exports workshop held here Dec. 3-4, sponsored by FOREST INDUSTRIES in cooperation with the National Forest Products Assn., American Plywood Assn. and Western Wood Products Assn.

John Ward, NFPA's director of international trade, noted that the U.S. enjoys an excellent long-term competitive position.

"We have the third largest inventory of wood fiber in the world (behind the U.S.S.R. and Canada), and our forest productivity exceeds that of either Canada or the U.S.S.R.," Ward said. The United States will increase its competitiveness in the world market, he predicted, because the Soviet Union soon will be forced to turn to Siberia for timber, Soviet and Canadian costs will increase as they go into less accessible areas for wood, and Scandinavia—the chief supplier to Europe—is approaching the limits of sustainable production. Consequently, Ward sees a steady increase in the volume of U.S. wood exports (see Fig. 1).

Where the markets are

Workshop speakers identified key export markets, detailing problems and potential in each area.

Table 1—Softwood lumber shipments, 1979
(Million board feet)

Major markets	Total imports	Major supplying regions				
		Canada	U.S.	Scandinavia	U.S.S.R.	Other
United States	11,118	10,780	—	—	—	338
Japan	2,011	1,015	833	—	57	306
United Kingdom	3,271	700	39	1,488	532	512
Western Europe	7,061	422	300	3,225	966	2,349
North Africa/Middle East	1,453	117	45	578	195	518
Australia	394	138	93	—	—	63
Other markets		91	523	636	1,485	
Total exports		13,281	1,733	5,927	3,234	

Source: Statistics Canada, Ottawa, Ont.

Japan: By far, Japan is the number-one market. Despite its housing crisis, the country needs great quantities of wood. Last year the U.S. sent $1.9 billion worth of wood to Japan (although two-thirds of that volume was logs).

"We think that over the next 10 years the Japanese market could increase by 50%, or another $1 billion," Ward said. He predicts the volume of raw logs will be halved, and lumber, chips, plywood and particleboard shipments will increase substantially. A "small but growing" trend toward building homes "the American way" (2x4 construction), he said, will boost export sales.

American plywood, however, is still faring badly in Japan. William Robison, APA vice president of marketing, told workshop registrants the Japanese market is "tantalizing, but virtually untapped." American manufacturers have been trying to break into that market since 1964 and have met "formidable obstacles," he said. Among the most serious:

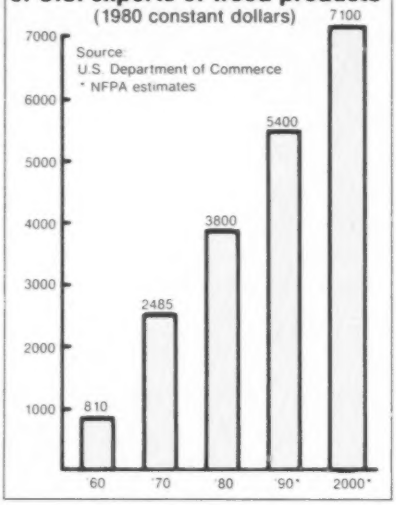
- American plywood isn't accepted by Japanese plywood standards.
- There is a prohibitive tariff on softwood plywood going into Japan.

Robison and others at the workshop spoke with cautious optimism about the third annual meeting of the U.S./Japan Forest Products Committee meeting, scheduled in Tokyo on Dec. 14. U.S. negotiators had submitted a list of 29 products of all types which they wanted discussed for tariff reduction. High on the list were softwood plywood, certain species of softwood lumber, hardwood and softwood veneer, and particleboard. Negotiators also intended to demand some response from the Japanese on plywood standards, a barrier the Japanese had said would be resolved by 1980. At press time, results of the meeting were not available.

Europe: After petroleum, wood products comprise the largest volume of imports in Europe. The United Kingdom in particular is a huge market, but the U.S. has been unable to crack it. Its share of U.K. imports is miniscule; it provides less than 1% of the softwood lumber, for example. In terms of softwood lumber exports, "the U.S. is tenth in line, behind Portugal and Poland," Ward noted.

For plywood, the picture isn't nearly as bleak. Exports to the U.K. have increased substantially—up 69% over last year, Ward said.

Fig. 1—History and Forecast* of U.S. exports of wood products
(1980 constant dollars)



Bob Hunt, director of marketing services for WWPA, predicted European lumber need is likely to increase 25 to 30% by the end of this decade. The strong trend toward timber frame construction, he said, will boost both lumber and plywood exports. The trend is prompted by a need for energy efficiency (fuel costs in Europe are 2½ times those in the U.S.). About 15% of the homes built in Europe last year used timber frame construction; that figure is forecast to rise to 30% by next year, and 70% to 80% in five years.

Middle East: The Middle East offers a relatively small market now, but it has enormous potential, Ward said. Softwood lumber demand has doubled in the past few years, and there has been a five-fold increase in plywood use in the past decade.

Producers in the West

Shipment of western products overseas results more from economic necessity than choice on the part of the producers. Some 1½ billion bd ft of western species was exported last year, and all signs indicate that volume will increase steadily. At the workshop, Hunt listed some of the reasons for the keen interest in offshore markets:

- A steep decline in domestic markets outside the West, largely due to staggering freight costs and availability of timber in Canada and the U.S. South. Western producers' share of the northeastern U.S. market has dropped from 50% 25 years ago to less than 5% today.
- Production in the region has remained high despite market erosion. To maintain production, companies must look elsewhere for markets.
- The Jones Act, which requires domestic companies to ship in American bottoms between U.S. ports, makes it more profitable for companies to ship offshore. It costs less to ship wood to Japan, for example, than it does to send it to many U.S. locations outside the western region. Although industry is waging an active campaign against the Jones Act, no amendment is in sight. Last month Sen. Mark Hatfield (R-Ore.) withdrew his bill to alter the act because he saw it as "an exercise in futility," observing, "Even if we succeed in getting such a bill through the Senate, the House will not be willing to address the issue during this Congress."

Improving profitability

Once a company decides to start exporting, what are the ways to reduce risks and increase profits? Workshop speaker Angel Diez, manager of wood products marketing for Publishers Paper Co. and president of the Pacific Lumber Exporters Assn., lists some:

1. Be strong in the marketplace. If you can't afford to operate overseas sales offices (and most companies cannot), get a good agent. He will most likely have several clients, but be sure he is looking after your interests.
2. Have a good product mix. Don't rely on just one or two products.
3. Supply top quality. Don't think of the export market as a dumping ground.
4. Export sufficient volume to keep your agent happy and to secure shipping space.
5. Specialize. Recognize that you can't be all things to all people. Pick the location where you can be strongest and concentrate your volume there.
6. Make a commitment to the market. There may be times when you could get top dollar elsewhere, but stay in the market. It will pay off in the long run, Diez said.

The need for increased commitment to the market was stressed by most workshop speakers. The U.S. has to change its reputation as an "in and out" exporter, and must overcome its fixation on the market here at home. If manufacturers improve consistency offshore and are willing to meet foreign size and standards requirements, the future for exports could indeed be a bright one. ■

New, planned and underway projects exceed $1.2 billion

That's the value calculated for new mills and remodeling jobs in the solid wood sector. Lumber represents half the figure; structural panels coming on strong

SAN FRANCISCO, CALIF.—An informal survey of forest products mill construction and modernization projects in the United States and Canada shows about US$1,215,050,000 worth of jobs either completed in 1981 or scheduled for completion this year or in the near future.

Much of this capital investment was committed before the housing crash brought virtually all of the wood industry into a period of curtailed production and low earnings. But much also reflects an undercurrent of activity—recession or no recession—aimed at getting ducks in a row for the time when economic conditions improve. The incessant need for improved lumber recovery, in the face of ever-rising raw material costs, is an important factor as well.

FOREST INDUSTRIES has tabulated this information twice in the past, with summaries appearing in our January 1979 and January 1980 issues. The same criteria were used in each case, i.e., projects completed in the year just past and those announced for future completion. In the January 1979 report there were 54 projects totaling $615.5 million, an average of $11.4 million per job. The January 1980 report contained 91 projects totaling $1.018 billion, an average of $11.19 million per entry. The tables on these pages contain 80 listings totaling the aforementioned $1.215 billion, an average of $15.19 million for each one.

An important caution should be observed in digesting this material: because of the overlapping periods involved, totals of the three published reports cannot be added together to produce an accurate capital expenditure figure for the extended period. Also, projects postponed for one reason or another, poor business being the most common reason among the current crop, may appear in more than one report.

Completion dates are as originally announced except in those cases where we have had updated information. We realize that many jobs have been postponed, scaled down or put on "slow bell" recently, and we have tried to reflect this as accurately as possible. Where no date was specified, we have indicated "future." If most of the work on a project completed in 1981 was done before the beginning of the year, we still counted it in the 1981 column.

The major source of information for the survey is the back issue file of this magazine: announcements in the *For the Record* department and feature stories describing new mills. Our "lead file" of new mill projects, maintained as a means of planning future story visits, was also consulted and produced some additional entries.

Value in most cases was stated in the pre-construction announcements and we have not attempted to make an adjust-

COMPANY AND LOCATION	TYPE OF PLANT	COMPLETION
NORTH, NORTHEAST U.S.; E. CANADA (TOTAL VALUE: US$361.24 MILLION)		
Blandin Wood Products, Grand Rapids, Minn.	Waferboard*	1982
Consolidated-Bathurst Ltd., St. Fulguence, Que.	Sawmill*	1982
Elmendorf Board Corp., Claremont, N.H.	OSB	1981
Forex-Leroy Inc., Val d'Or, Que.	Structural board	1982
Georgia-Pacific Corp., Woodland, Me.	Waferboard	1981
Grant Lumber Ltd., Englehart, Ont.	Waferboard	1982
Great Lakes Forest Products Ltd., Dryden, Ont.	Stud mill	Future
J.M. Huber Corp., Aroostook Co., Me.	Structural board	1983
Les Matériaux Blanchet, Saint-Pamphile, Que.	Sawmill	Future
Louisiana-Pacific Corp., Hayward, Wis.	Waferboard*	1982
Louisiana-Pacific Corp., Houlton, Me.	Waferboard	1982
Potlatch Corp., Bemidji, Minn.	OSB	1981
Potlatch Corp., Cook, Minn.	OSB	1982
Waferboard Corp., Timmins, Ont.	Thinboard	1982
Weyerhaeuser Co., Grayling, Mich.	Flakeboard	1982
Whitehall Plywood Corp., Whitehall, N..Y.	Plywood	1981
SOUTH ATLANTIC U.S. (TOTAL VALUE: $227.7 MILLION)		
Abitibi-Price Inc., Roaring River, N.C.	Hardboard*	1981
American Can Co., Bellamy, Ala.	Sawmill	1981
Boise Cascade Corp., Chester, S.C.	Plywood, sawmill	1981
Brunswick Pulp & Paper Co., Sterling, Ga.	Sawmill	1982
Buckeye Cellulose Corp., Barnesville, Ga.	Sawmill	1982
Chesapeake Corp. of Va., Princess Anne, Va.	Sawmill	1982
Chesapeake Plywood Inc., Pocomoke City, Md.	Plywood*	1982
Columbia-Carolina Corp., Marion, N.C.	Plywood	Future
Federal Paper Board Co., Lilesville, N C.	Plywood	1982
Federal Paper Board Co., Newberry, S.C.	Sawmill*	1981
Georgia Kraft Co., Rome, Ga.	Sawmill	1981
Georgia-Pacific Corp., Ellabelle, Ga.	Sawmill	1981
Hammermill Paper Co., Tuscaloosa, Ala.	Sawmill	1982
Holly Hill Forest Inc., Holly Hill, S.C.	Treating	1982
New South Forest Industries, Camden, S.C.	Sawmill	1982
Owens-Illinois Co., Lake Butler, Fla.	Sawmill	1981
Westvaco Corp., Summerville, S.C.	Sawmill*	1981

*Expansion or modernization

ment for inflation for postponed projects. Where cost was not specified, we made our own estimates. Values for Canadian projects were converted to U.S. dollars.

Disclaimers aside, the figures add insight to the health of the industry, suggesting that its proper place is at least in the infirmary rather than the mortuary. Some cross-tabulation also provides an edifying look at regional and product patterns.

The regional totals, the way we've broken them down, are listed in the tables. Extracting an Eastern Canada total of US$65.49 million and adding it to the Western Canada sum of US$163.51 million brings that country's listed total to US$229 million. The value of United States projects listed comes to $986.05 million.

Adding the South Central and South Atlantic totals produces $347.2 million for the South as a whole, against $343.1 million for the Western U.S. Another $295.75 million is accounted for in the Northern and Northeastern states.

Product distribution shows sawmill construction, enlargement and modernization projects accounting for a noteworthy 50.3% of the total, a figure of $610.97 million. This shows that the future of sawn wood remains promising in spite of the good press obtained by engineered wood products.

Panel totals reflect continued growth in variations on the pressed fiber theme. Plants to produce structural panels, including oriented strand board and waferboard, at $273.59 million, and other types of pressed board, at $103.98 million, together accounted for 31.1% of the grand total, or $377.57 million. Plywood manufacturing projects came to $138.1 million, 11.4% of the pie. The remaining 7.2% is composed of a variety of miscellaneous projects from treating plants to dock facilities.

Inarguably, the capital spending total calculated from the tables here is increased by projects started before the forest products recession reached its current miserable proportions. But the announcements of new projects keep filtering in, and a breakdown of figures by year of scheduled completion shows slightly more value represented by 1982 than by 1981. However, there is a sharp falloff beyond 1982, indicating a cautious approach to long-term commitments, a product of the current economic climate.

COMPANY AND LOCATION	TYPE OF PLANT	COMPLETION
SOUTH CENTRAL U.S. (TOTAL VALUE: $119.5 MILLION)		
International Paper Co., Coushatta, La.	Sawmill*	1982
International Paper Co., Durant, Miss.	Hardwood sawmill	Future
International Paper Co., Kosciusko, Miss.	Sawmill	Future
International Paper Co., Mineola, Tex.	Treating	1981
International Paper Co., Noble, La.	Sawmill	Future
International Paper Co., Springhill, La.	Sawmill, plywood	1981
Manville Forest Products Corp., Huttig, Ark.	Sawmill*	1983
WESTERN U.S. (TOTAL VALUE: $343.1 MILLION)		
Alaska Lumber & Pulp Co., Wrangell, Alaska	Sawmill*	1981
Boise Cascade Corp., Yakima, Wash.	Plywood*	1981
Burlington Northern Corp. (& Colville Confederated Tribes), Ferry County, Wash.	Sawmill	Future
Cascade West Forest Products, Olympia, Wash.	Sawmill	1981
Champion International Corp., Roseburg, Ore.	Plywood*	1983
Crown Zellerbach Corp., Omak, Wash.	Plywood*	Future
Dant & Russell Inc., Warrenton, Ore.	Sawmill*	Future
Diamond International Corp., Redmond, Ore.	Plywood*	1981
Georgia-Pacific Corp., Coquille, Ore.	Log processing	1981
Hanel Lumber Co., Hood River, Ore.	Sawmill*	1981
Edw. Hines Lumber Co., Hines, Ore.	Sawmill	1981
International Paper Co., Gardiner, Ore.	Sawmill*	1982
ITT Rayonier Inc., Hoquiam, Wash.	Dock facilities	1981
ITT Rayonier Inc., Hoquiam, Wash.	Sawmill*	1981
Kinzua Corp., Heppner, Ore.	Sawmill*	1981
Layman Lumber Co., Natches, Wash.	Sawmill*	1982
Louisiana-Pacific Corp., Rocklin, Calif.	MDF*	1981
Merritt Bros., Priest River, Ida.	Sawmill	1981
North Side Lumber Co., Philomath, Ore.	Sawmill	1982
Pine Products Inc., Prineville, Ore.	Sawmill*	1981
Pope & Talbot Inc., Oakridge, Ore.,	Sawmill*	1981
Pope & Talbot Inc., Port Gamble, Wash.	Sawmill*	1981
Pope & Talbot Inc., Spearfish, S.D.	Sawmill	1982
Seaboard Lumber Co., Seattle, Wash.	Sawmill	1981
Simpson Timber Co., Korbel, Calif.	Sawmill*	1981
Stimson Lumber Co., Forest Grove, Ore.	Sawmill	1982
Trus-Joist Corp., Eugene, Ore.	Lam. veneer lbr.*	1982
Weyerhaeuser Co., Raymond, Wash.	Sawmill	1981
Weyerhaeuser Co., Tacoma, Wash.	Dock facilities	Future
Willamette Industries, Lebanon, Ore.	Sawmill*	1981
Willamina Lumber Co., Willamina, Ore.	Sawmill*	1981
WESTERN CANADA (TOTAL VALUE: US$163.51 MILLION)		
B.C. Forest Products Ltd., Grands Cache, Alta.	Sawmill	1981
B.C. Forest Products Ltd., Knight, Alta.	Sawmill	1982
B.C. Forest Products Ltd., Maple Ridge, B.C.	Sawmill	1981
Crown Zellerbach Canada Ltd., Coquitlam, B.C.	Sawmill	1983
Lakeland Mills Ltd., Prince George, B.C.	Sawmill	1981
Northwest Panel Board Ltd., Smithers, B.C.	Thinboard	1981
Simpson Timber Co. Ltd., Blue Ridge, Alta.	Finger joint	1982
Trus-Joist Corp., Claresholm, Alta.	Lam. veneer lbr.	Future
Weldwood of Canada Ltd., 100 Mile House, B.C.	Sawmill	1982

* Expansion or modernization

Projects completed in 1981 totaled $484.33 million, 39.9% of the total. Of these, $159 million were in the South, $138.5 million in the West, $103 million in the northern states and Eastern Canada, and $83.83 million in Western Canada. The 1982 figure is $492.77 million, 40.5% of the total, broken down regionally to $218.94 million in the northern states and Eastern Canada (the influence of structural panel plants and expansions), $116 million in the West, $107.2 million in the South and another $50.63 million in Western Canada. Projects for which a 1983 completion were specified totaled $76.2 million, while those in the "future" column totaled $150.25 million. ■

C3975-1

FEBRUARY 1982

FOREST INDUSTRIES

LOGGING/PULPWOOD/FORESTRY/LUMBER/PANELS

Steep-country logger fights the depression

BEST AVAILABLE COPY

FOREST INDUSTRIES 1982 Volume 109 Number 2

FEBRUARY

Industry

25
Southern chip exports depend on Europe's use of pulp, paper products, where they can buy chips
Scandinavia started buying southern chips in mid-'70s; with fiber shortages likely in Europe, South's market chip could grow. Tariffs favor pulp imports

50
Portland preview: a look at what to expect at the clinic-machinery show, plus a list of attractions
With more than 500 displays, the Portland Clinic & Show has a lot to see during its March 3-5 run. There's a list of exhibitors, plus suggestions for things to do and places to eat in Portland

Cover story, page 23

Woods

23
Logger's three sides defy industry depression
Dale Music of Trail, Ore., and his sons keep three sides going in Oregon and California for sawmill, power plant

27
Quality control in woods improves loggers' work, boosts lumber recovery
Incentive program for fallers is part of Hines Lumber Co.'s quality control program for eastern Oregon operations

40
Touchiest logging job: clearing reservoir shores
M&M Helicopters, Sutter, Calif., faced ticklish task of logging around a Marin County reservoir. The job is fraught with all kinds of discouraging peril

42
Fuelwood harvesters cut 1,000 tons a week
Cruce Logging of Greenville, Fla., an all-mechanized outfit, gets out small timber to help fuel a pulp mill

29
Lumber recovery rises 5%; new chipping edger gets the credit, but is just part of updating
Gray Lumber Co. of Waverly, Va., gets more lumber per log with a new chipping edger with optimizing infeed. Sawyer works alone on headrig side of mill

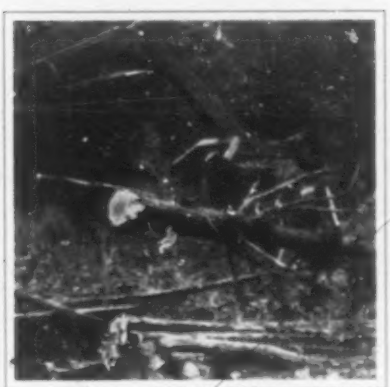
page 27

39
Two portable sawmills cut cedar logs into cants and a variety of other lumber products
Two partners formed Horizon Forest Products in Camas, Wash. Ten men operate the two portable sawmills, cutting cedar logs they buy from private lands and federal sales

Energy

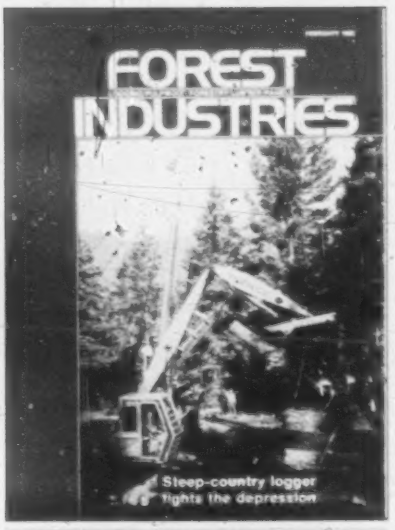
57
Solar energy project: 'sun power' heats, cools greenhouse in Louisiana
A greenhouse in the Alexander State Forest is ready to test solar heating and cooling, as well as the possibility of year-round indoor plant production

59
New from the USFS: a circular calculator that estimates firewood volume and weight
The latest free 'calculator' designed by the Forest Service gives foresters estimates of the amount of firewood available from southern hardwoods



page 42

5 **Comment**
7 **Washington**
9 **For the Record**
11 **Letters**
57 **Industrial Wood Energy**
59 **Equipment**
65 **Industry News**
69 **Meetings**
70 **Newsmakers**
72 **Books/Bulletins**



Herbert G. Lambert: Editor
David A. Fease: Executive Editor
Richard W. Bryan: Associate Editor
Ted Blackman: Associate Editor
Mary Lou Corlett: Managing Editor
Luke Popovich: Washington Correspondent
Peter A. Tucker: Art Director
Janet A. Duncan: Technical Artist

Norman T. Rae: Publisher

PUBLISHING OFFICE
500 Howard Street
San Francisco, Calif. 94105
Telephone: (415) 397-1881
Telex 278273
Cable: Millfreepub

REGIONAL EDITORIAL OFFICES
P.O. Box 1371
Pineville, Louisiana 71360
Telephone (318) 640-0198

64646 McGrath Rd.
Bend, Oregon 97701
Telephone (503) 388-4348

1100 17th St. N.W., Suite 710
Washington, D.C. 20036
Telephone: (202) 328-8413

SUBSCRIPTIONS: Sent without charge to management, production, technical, engineering maintenance and other supervisory personnel in logging, pulpwood and forest management firms; and in firms manufacturing lumber, plywood, board, and pulp in the U.S./Canada. To all others there is a subscription charge of $30 a year in the U.S./Canada. All subscriptions in other countries: $40 a year, except Europe and the Mediterranean, $50 (air service included). Single copy $3, except May Annual Lumber Review & Buyer's Guide, $15. Available in microform through Bell & Howell and University Microfilms.

Requests, subscription orders and address changes must show name, job or position of individual, name and location of mill, plant or office where employed, and exact business conducted at this location. Send subscription correspondence to Circulation Department, FOREST INDUSTRIES, 500 Howard Street, San Francisco, Calif. 94105. For address change, include label from recent issue.

FOREST INDUSTRIES (USPS 205-060) is published monthly except May when semi-monthly by Miller Freeman Publications, 500 Howard Street, San Francisco, Calif. 94105. Second class postage paid at San Francisco, Calif., and at additional mailing office. POSTMASTER: Please send Form 3579 to FOREST INDUSTRIES, 500 Howard Street, San Francisco, Calif. 94105.

Southern wood chip exports should undergo gradual gain

Shipments from Gulf and Atlantic ports are tied to European pulp and paper market. In 1980, volume exceeded 1.2 million tons, destined mainly for Sweden

By JAMES E. GRANSKOG
and HAROLD W. WISDOM

NEW ORLEANS, LA.—The outlook for wood chip exports from the South will be influenced largely by western Europe's consumption of pulp and paper products and how that market will be supplied, with a result that exports will increase gradually over the next several years.

Export shipments of chips from the South to Scandinavia began in the mid-1970s, and in 1980 more than 424,000 oven-dry tons valued at almost $27 million were shipped from southern ports.

Although tempered by the energy situation, projections for the next two decades indicate a large deficit for fiber-based products in western Europe, particularly within the European Economic Community. All EEC countries are net importers of wood fiber, and while internal wood supplies, utilization of residues and recycling of waste paper will increase, further growth in imports of pulp and paper products from other regions is expected.

For softwood-based products, potential supply regions for EEC nations include Scandinavia, the Soviet Union, Canada and the United States. In Scandinavia, however, timber harvests are near current annual growth. And while Canada and the Soviet Union have large reserves of softwood timber, the amount that is considered economically accessible is limited. In the United States, the South is a timber surplus region and is favorably located in relation to the European market.

TABLE 1—Volume and value of wood chips exported from the South

Year	Volume	Value	
		Total	Average
	(oven-dry tons)	(f.a.s.)	
1967	290	$6,887	$23.75
1970	9,900	180,000	18.18
1973	22	539	24.50
1974	16,212	663,227	40.91
1975	93,309	4,626,099	49.58
1976	85,639[1]	4,420,478	51.61
1977	263,890[1]	12,084,546	45.72
1978	90,434	3,829,395	42.34
1979	222,975	11,240,831	50.41
1980	424,621	26,800,515	63.12

[1]Volume includes estimated tonnage of chips shipped under nonpulpwood classifications.

Due partly to the favorable resource base and partly to other factors, including scale and integration economies, the southern pulp and paper industry is generally acknowledged to be a low-cost producer of many commodities. Such cost efficiency by itself would tend to favor the export of manufactured products rather than the raw material, particularly in light of the low value/weight ratio of wood chips.

However, development of specialized ships and efficient port facilities has aided the long-distance transportation of chips. But rising fuel prices will make transportation costs more significant in future chip shipments.

EEC tariff barriers may also play a role in potential trade patterns. Although tariffs on the average are being reduced as a result of the latest Multilateral Trade Negotiations, U.S. paper producers still face a disadvantage in competition with Scandinavian producers in the EEC market. By 1984, EEC tariffs will be eliminated for Scandinavian and other members of the European Free Trade Assn., while the tariffs for most U.S. paper products will only drop to 6-9% by 1987. U.S. pulp exports are allowed duty-free entry to the EEC, and tariffs for wood chips are scheduled to decline from 4% to 3.2%.

On balance, tariff effects will tend to favor EEC imports of pulp from the U.S. and paper products from Scandinavia. Without shifting present export markets, Scandinavia would require more chips or pulp to increase paper

shipments to the EEC. Chips from the South may be favored up to existing levels of pulping capacity, or if the prices for domestic chips approach the delivered price of southern chips. Pulp imports probably would be favored for any expansion of paper capacity—a prospect that over the long term may raise interest for Scandinavian investment in pulping facilities in the South.

Other factors may influence future chip exports as well. These include the level of economic activity in western Europe, nontariff barriers, exchange rate fluctuations and the export aggressiveness of U.S. manufacturers. Economic and monetary factors in particular may cause short-term fluctuations in shipments, such as occurred in 1978.

The net effect of all factors should be a gradual increase in southern chip exports over the next several years.

Wood chip trade: background

World trade of pulpwood in chip form is a fairly recent development. Overseas trade began in 1964 when shipments were initiated between Oregon and Japan. Total world trade in wood chips has since grown to an annual volume of 12 million m^3, or almost 5 million cords. More than 80% of that volume involves ocean shipments from various countries to Japan, while the remainder is primarily cross-border type of trade in Europe and North America.

Japan has dominated development of the wood chip trade. In the process of steadily increasing chip imports to supply its pulp industry, Japan has diversified its sources of supply. Besides the U.S. West Coast, Japan's chip suppliers include Australia, New Zealand, the Soviet Union, Indonesia, Malaysia, South Africa and Canada. Although trial shipments of chips to Japan from the South were made in 1970 and 1974, further trade did not develop until 1980.

Like Japan, Europe is a major deficit area for wood fiber. Western European nations have traditionally relied on the Scandinavian countries to supplement domestic supplies of papermaking fiber. However, booming European markets in the early 1970s caused Scandinavian pulp industry requirements to exceed domestic chip and other pulpwood supplies, stimulating their interest in new sources of raw material. At the same time, a surplus of chips developed in the U.S. South, as pulp industry requirements lagged behind rising lumber sales following the 1974-75 recession.

Trial shipments to four European countries from the South in 1975 and 1976 were followed by long-term agreements for chip sales to Sweden. Two contracts were negotiated for 2.4 million oven-dry tons over a period of six years.

Conditions in Sweden favored the import of wood fiber. Domestic chip prices, which doubled from 1973 to 1976, made wood chips from the U.S. South a feasible alternative. Also, an uneven age distribution in Swedish forests and government policies toward maintaining employment and pulp industry exports motivated use of external raw material supplies.

The long-term contracts provided the assurance required to construct chip export facilities. New chip terminals were completed at Lake Charles, La., in 1976 and Savannah, Ga., in 1977. Prior trial shipments were made primarily from bulk cargo handling facilities in Morehead City, N.C.

The volume and value of wood chips exported from southern ports through 1980 are shown in Table 1, along with the average unit value. Because the moisture content of green chips will vary, chip export volumes are recorded in oven-dry tons to provide a consistent transaction or valuation unit. Values are f.a.s. (free alongside ship) at the port of export, and include f.o.b. mill price, inland freight and port charges for placement alongside the chip vessel.

Volume figures for 1976 and 1977 include tonnage estimates for chips chipped under commodity classifications other than pulpwood in chip form. Prior to 1978, wood chips not identified as pulpwood were included with other products and reported by value only, because the category lacked a common unit of measurement. Volume estimates for these shipments were derived by dividing total values by appropriate unit values. These estimated volumes were combined with the volumes reported for the pulpwood chip category. Beginning in 1978, a revision of the export commodity classification system created a single category for all wood chips.

Exports surged in 1977 as the new chip terminals began to operate. However, shipments were curtailed in 1978 because of depressed European markets and related difficulties. This created downward pressure on prices, although some hardwood chip sales helped to reduce average prices slightly for 1977 and 1978. Shipments picked up in 1979, but still were below levels expected from long-term contracts. Spot sales to Japan helped boost shipments in 1980.

Through 1980, cumulative totals for southern chip exports exceeded 1.2 million tons and $63.8 million. As shown in Table 2, 87% of all shipments have gone to European destinations.

Chip exports to countries other than Sweden thus far have been trial or spot shipments. During 1980, Norwegian pulp companies were reportedly seeking a long-term supply agreement for southern pine wood chips. Also in 1980 there were 109,000 tons shipped to Japan under spot contracts because of escalating prices for chips from the West Coast.

Figures were developed from export records of 11 southern customs districts: Norfolk, Va.; Wilmington, N.C.; Charleston, S.C.; Savannah, Ga.; Miami and Tampa, Fla.; Mobile, Ala.; New Orleans, La.; and Port Arthur, Galveston and Houston, Texas. ■

TABLE 2—Destination of southern wood chip exports 1967-1980

Country	Volume	Percent
	(oven-dry tons)	
Sweden	967,520	80.1
Japan	135,358	11.2
Finland	41,160	3.4
Italy	30,883	2.6
France	16,109	1.3
Venezuela	15,481	1.3
Others	781	.1
Total	1,207,292	100.0

ABOUT THE AUTHORS: Granskog is principal economist at the Southern Forest Experiment Station, USDA Forest Service, New Orleans, La. Wisdom is associate professor of forest economics at Virginia Polytechnic Institute and State University, Blacksburg, Va.

C3975-1 4/16/82

APRIL 1982

FOREST INDUSTRIES

LOGGING PULPWOOD FORESTRY LUMBER PANELS

1982 Panel Review

Oriented strand board—new panel product in U.S.

FOREST INDUSTRIES *1982 Volume 109 Number 4*

APRIL

21
Jim Watt is determined to change Interior policy in favor of 'wise use'
In an interview, Watt thanks Sierra Club for 'vicious attacks' which help swing attitudes back from preservationism

page 21

57
Wood Energy Forum '82 highlights what's new in industrial wood fuel use
The Forest Products Research Society's sixth annual international wood energy conference drew a crowd of several hundred to learn about the most recent wood fuel technology

24
Poor panel market requires smarts, selling to compete successfully
It seems only Superman could make money in today's depressed panel market. State of the industry reviewed

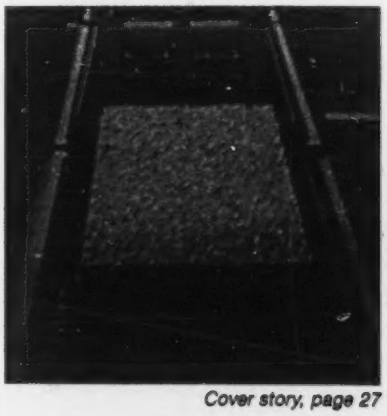
27
Oriented strand board hits U.S. market from first commercial plant
Elmendorf Board Corp. is making OSB at Claremont, N.H., from a varied mix of hard and soft woods, using logs once considered a hindrance to logging

41
Particleboard firm's woe: where to find raw material to keep plant running
Hambro Forest Products added a new line, runs full speed, but keeping enough furnish for the Crescent City, Calif., plant is a problem with sawmills down

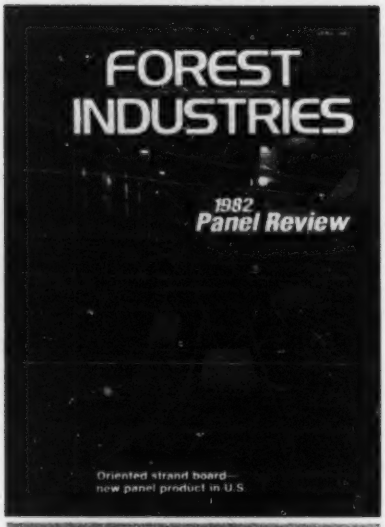
43
Formaldehyde emissions tested at plant's new lab
With regulators looking hard at formaldehyde, panel manufacturer went to work to cut emissions. Hambro is below proposed U.S. standard

44
One solution to spinout: a powered backup roll can cut losses greatly
Boise Cascade's test of the roll came at Yakima, Wash., mill where spinout was a big problem. In white fir, spinout fell from 50% to 25%; veneer recovery rose 2%

46
'82 panel directory lists producers in U.S., Canada
From plywood to particleboard, directory lists existing plants, capacity estimates and locations. New composite panel-makers included



Cover story, page 27



Woods

50
A sure-fire way to make profit in wood business: turn logs into firewood

Alpine Firewood Inc. in Aurora, Colo., is a small outfit with more work than its owners can handle. Turning 'cull' logs into firewood makes them valuable

52
Brothers log steadily, thanks to reputation for good job in mixed woods

Thornton & Thornton Logging, Lockesburg, Ark., use manual felling with grapple and cable skidding to get the wood out for Weyerhaeuser Co.

page 52

Departments

5
Comment

7
Conversation

9
Washington

11
For the Record

57
Industrial Wood Energy

62
Equipment

64
Industry News

68
Meetings

69
Newsmakers

Herbert G. Lansdell Editor
David A. Pease Executive Editor
Mary Lou Corlett Managing Editor
Ted Mackinnon Associate Editor
Peter L. Ogle Associate Editor
Lane Pepovich Washington Correspondent
Peter A. Tiesen Art Director
Janet A. Dunseath Technical Artist

Norman T. Rae
Publisher/Editorial Director

PUBLISHING OFFICE
500 Howard Street
San Francisco, Calif. 94105
Telephone: (415) 397-1881
Telex 278273
Cable: Millrapub

REGIONAL EDITORIAL OFFICES
Suite 530
2700 Cumberland Parkway, N.W.
Atlanta, Georgia 30339
Telephone: (404) 432-3186

733 S.W. Oak St.
Portland, Oregon 97205
Telephone: (503) 222-1319

P.O. Box 19187
Washington, D.C. 20036-0187
Telephone: (202) 328-8413

SUBSCRIPTIONS: Sent without charge to management, production, technical, engineering maintenance and other supervisory personnel in logging, pulpwood and forest management firms; and in firms manufacturing lumber, plywood, board, and pulp in the U.S./Canada. To all others there is a subscription charge of $30 a year in the U.S./Canada. All subscriptions in other countries: $40 a year, except Europe and the Mediterranean, $60 (air service included). Single copy $3, except May Annual Lumber Review & Buyer's Guide, $15. Available in microform through Bell & Howell and University Microfilms.

Requests, subscription orders and address changes must show name, job or position of individual, name and location of mill, plant or office where employed, and exact business conducted at this location. Send subscription correspondence to Circulation Department, FOREST INDUSTRIES, 500 Howard Street, San Francisco, Calif. 94105. For address change, include label from recent issue.

FOREST INDUSTRIES (USPS 208-080) is published monthly except May when semi-monthly by Miller Freeman Publications, 500 Howard Street, San Francisco, Calif. 94105. Second class postage paid at San Francisco, Calif., and at additional mailing office. POSTMASTER: Please send Form 3579 to FOREST INDUSTRIES, 500 Howard Street, San Francisco, Calif. 94105.

Faith, intuition, good selling help cope with panel market

Even that combo isn't always enough to keep a plant running these days. If you don't want to call the panel market 'terrible,' just say the situation is 'fluid'

By HERB LAMBERT
Editor

SAN FRANCISCO, CALIF.—Coping with the panel market in 1981—and even now, into the first half of 1982—has called for Superman capacity. It takes religious faith, seat-of-the-pants intuition, intensified marketing and a host of other things.

Even so, that combination could not forestall some panel plant closures, nor stave off slow-bell operations. Panels may not have suffered the effects of the market as much as lumber, but they were not much better off.

This situation brings to mind a military phrase: "The situation is fluid."

That could mean our forces are advancing. Or it could mean the enemy is on the offensive. Maybe there are momentary stalemates. Or it could mean there is some backpedaling going on. For the most part, the phrase means, "We just don't know what the hell is happening."

It should be added, just so forest industry and military people don't feel singled out, that most of the nation's economists and market experts can't offer definitive and lasting forecasts.

1981: a terrible year

So much for a so-called introduction to this review of 1981 in the panel sector. In short, 1981 was a terrible year, and a confused one.

It wasn't entirely black, however. There were a few announcements other than closures, and as 1982 dawned, there were some feelings that its last half will see improvement. It won't be vigorous, but it will be encouraging.

As for production data, a glance at the 1971-81 summary table on this page shows that medium-density fiberboard (MDF) fared better than the other panel products. Production of 513 million ft² in 1981 was just about equal to 1980. In fact, 1981 showed a tiny advance, but hardly enough to crow about: the 513-million figure is listed for both years.

MDF seems to be enjoying at least some of the market acceptance which put particleboard on the zoom in the 1960s and early '70s. The Cleveland, Ohio-based market research firm, Predicasts Inc., estimates MDF shipments will reach nearly 2 billion ft² by 1995.

The highest-volume panel product, softwood plywood, scored an estimated 17.013 billion ft² in 1981, up from 1980's 16.468 billion. If the early-1982 outlook is borne out, 1982 production will top 18 billion ft² slightly.

Hardwood plywood registered 1.1 billion ft² in 1981, down from the 1.312 billion ft shipped in 1980.

Hardboard output varied only modestly, with 1981 production estimated at 1.104 billion ft², compared with 1.14 billion in 1980—a difference of just 46 million ft².

The gap was wider for particleboard. Production fell by 108 million ft² in 1981—2.921 billion ft last year, compared with 3.029 billion in 1980.

Statistics on insulation board were not available.

Canadians also hurting

The panel sector in Canada shared in the market stress U.S. companies suffered. The situation north of the border was further aggravated by a six-week strike.

Structural panel production for 1981 for all of Canada was estimated at 2.25 billion ft², compared with 2.6 billion ft²

Production—1971-1981
(sq ft)

Year	Particleboard ¾-in. basis	Hardboard ⅛-in. basis	MDF ¾-in. basis	Softwood plywood ⅜-in. basis	Hardwood plywood surface measure
1971	2,393,760,000	5,224,769,000	—	16,634,971,000	2,040,242,000
1972	3,116,944,000	5,798,376,000	—	18,323,754,000	2,223,182,000
1973	3,493,648,000	6,475,387,000	—	18,304,599,000	2,048,362,000
1974	3,103,800,000	6,056,542,000	—	15,878,380,000	1,644,043,000
1975	2,538,934,000	6,237,908,000	215,496,000	16,050,180,000	1,279,592,000
1976	3,202,200,000	7,066,022,000	280,036,000	18,400,000,000	1,463,135,000
1977	3,592,210,000	7,200,000,000	441,354,000	19,300,000,000	1,478,000,000
1978	3,610,000,000	7,800,000,000	480,000,000	19,760,000,000	1,480,571,000
1979	3,300,000,000	7,687,798,000	490,000,000	19,750,000,000	1,434,521,000
1980	3,029,000,000	6,140,000,000	513,000,000	16,468,000,000	1,312,000,000
1981	2,921,000,000	6,104,000,000	513,000,000	17,013,000,000	1,100,000,000

Wood-based panel plants—U.S.-Canada

Data received by Feb. 28, 1982

State or Province	Swd. Ply.	Hwd. Ply.	Particle-board	Hard-board	Insul. Board	MDF	Thin Panel	Water-board	Com-posite
Alabama	9	4	4		1	1			
Arkansas	8	4	2	1			1		
California	7	9	5	1		1	1		
Florida	2	1	1						
Georgia	5	5	3		1		1		
Idaho	5	2	1						1
Indiana		4	1						
Iowa					1				
Kentucky		2	1						
Louisiana	15	2	3						
Maine					1			1	
Maryland	1								
Massachusetts									
Michigan	1	5	1	1					
Minnesota		1	1	3	2	1	1	2	
Mississippi	6	2	3	1	2		1		
Missouri					1				
Montana	4		1			1			
New Hampshire		1	1						
New Jersey		1							
New Mexico			2						
New York	1	2				1	1		
North Carolina	5	26	2	2	1	2	1		1
Oklahoma	1		1		1	1			
Oregon	71	7	11	6	2	1			2
Pennsylvania		1	1	1	1	1			
South Carolina	3	14	1	1		2			
Tennessee		5	1	1					
Texas	11	2	2	1	1				
Vermont		3							
Virginia	1	10	6	2	2				
Washington	21	4	1	1					
West Virginia									
Wisconsin		11	2	2			1	1	
Total	**177**	**126**	**58**	**24**	**17**	**12**	**8**	**4**	**4**
Alberta	3				2				
British Columbia	22	1	2	1					
Manitoba									
New Brunswick	1		1				1	1	
Newfoundland		1							
Nova Scotia				1					
Ontario	3	8	7	1	1	1	1	5	1
Saskatchewan	1							1	
Quebec	1	7	1	1	3			1	
Total	**31**	**17**	**11**	**4**	**6**	**1**	**2**	**9**	**1**
Grand total	**208**	**143**	**69**	**28**	**23**	**13**	**10**	**13**	**5**

in 1980. British Columbia, the dominant wood products province, produced 1.95 billion ft² of panels, down from 2.2 billion in 1980.

What about the other panel products: flakeboard, waferboard, composite board and oriented strand board? We have no specific figures, but just listing them emphasizes the transition in the panel industry. "Structural" has become the key word. It's not a new word, but it is becoming the accepted term because the thrust now seems to be to design a panel for an end use, regardless of what raw material may go into it.

Consider only end use

Prof. Tom Maloney of Washington State University in Pullman directs the International Particleboard Symposium held there every year, an event which draws worldwide attendance.

Maloney, a recognized authority on panels, says this about end use: "Define the end use of a product, then make it to meet the appropriate specifications. Do not be concerned about how to make the product or about the various components of the product. The objective is simply to make a product which meets the end use specifications."

Maloney cites, as evidence of this approach, the Performance Standards promulgated by the American Plywood Assn. covering waferboard, composite boards, flakeboard, coventional particleboard made from shavings and the association's softwood plywood.

There has been talk for many years about reconstituted wood being the answer to many challenges: resource utilization, maximum quality control in production, better performance in specific applications and others. It would appear that we're approaching this destination with increasing speed.

Who knows, we may be approaching an era in which panels are divided into only two categories: structural and nonstructural. It will be interesting to follow the advances in the years immediately ahead.

Another industry milestone?

The current transition in the panel sector may someday be considered as a milestone in that part of the solid wood products industry. Somewhat the same thing might be said for softwood plywood in light of changes since production began in the South.

Until 1964, the softwood plywood industry was a five-state entity. Oregon led in production volume, followed in order by Washington, California, Idaho and Montana. In 1964, plywood production started in Arkansas.

The newcomer added 65 million ft² in 1964 to the West's 11.599 billion ft². By 1980, APA figures showed the original five western states producing 8.919 billion ft, while southern states produced 7.393 billion. And some plywood was being made in Great Lakes states.

A variety of factors is involved, including timber supply and, possibly more importantly, timber availability. Other factors: markets, freight rates and technical innovations. Some or all of these factors will strongly influence any expansion of the reconstituted board industry.

1981's bright spots

Despite shutdowns and slowdowns, 1981 offered some bright spots. Among them are these, gleaned from the year's news releases:

- J.M. Huber Corp. will build a structural waferboard plant, to cost about $30 million, in Easton, Maine. Scheduled to start up early in 1983, the NGM International-designed plant will be the first in the U.S. to use a caulless forming line.
- An MDF plant at Las Vegas, N.M., is slated to start up in 1984. The plant will have a capacity of 72 million ft² a year. Meadows Resources Inc. and Frontier Fiber Inc. are partners in the plant.
- New York State's first softwood plywood plant, Whitehall Plywood Co. in Whitehall, began peeling veneer this year.
- The former Edward Hines plywood plant at Westfir, Ore., down for two years after a fire, is now open again as West Ridge Plywood Co.
- International Paper Co. started up its Springhill, La., plywood plant which can produce 180 million ft² annually.
- Louisiana-Pacific Corp. plans to double the capacity of its waferboard plant at Hayward, Wis., to 260 million ft², and build another waferboard plant at Houlton, Maine.
- Elmendorf Board Corp. has started making oriented strand board (OSB) at Claremont, N.H.
- Potlatch Corp. began making OSB in Bemidji, Minn., and is building a second OSB plant at Cook, Minn.
- Columbia Plywood Corp. recently announced a plywood plant, part of a multi-mill complex, at Marion, N.C. Yellow poplar will be the raw material.
- The Chesapeake Corp. of Virginia finished expanding its plywood plant at Pocomoke City, Md., this year.
- Panofor Ltd., a subsidiary of Forex LeRoy Ltd., is building a waferboard plant at Val d'Or, Que. Panofor said it will be the world's first waferboard plant to use horizontal disc waferizers and a caulless belt forming line. Aspen, birch and poplar will be the furnish.

The three-year-old drop in homebuilding has hurt panels as well as lumber. But two things seem to have kept panels from suffering equally: marketing efforts aimed at non-residential uses and at increasing exports.

Marketing push continues

The push continues in these two important areas, and 1982 should see even better results than last year's. An expected modest upturn in housing by the second half of this year suggests a more encouraging outlook for 1982.

Nowhere in this roundup has there been mention of specific mills or plants being shut down, sold or mothballed. Such things certainly happened, but it would be difficult to identify each mill affected, and even harder to try to say when it was working or down, or for how long. Some plants are, even now, up for sale. Some have been sold. Others have been cannibalized. The machinery has been sold out of some, leaving only the plant shell.

We emphasize this point because readers will not be able to reconcile the figures in the "universe" table on page 25 with the panel directory on pages 46-49. Some of the plants listed in the directory will not reopen, so they are lost from the total count.

Overall, however, we prefer to use the glass-half-full approach to the glass-half-empty theory, so we have kept our listings more or less intact. The totals in the state/province "universe" table reflect information from various sources. They cannot be matched with plants named in the directory.

The editors of FOREST INDUSTRIES have started trying to pin down more precisely the "panel universe" between now and next year's report, due in the April 1983 issue. We hope readers will tell us of changes, or of omissions and errors—whether about their own plants or those of other companies. ■

Directory of Panel Plants—U.S.

HARDWOOD PLYWOOD

C & B Plywood Co., Abbeville, Ala.
Union Camp Corp., Chapman, Ala.
Taylor Veneer Co., Demopolis, Ala.
Howell Plywood Corp., Dothan, Ala.
Thompson & Swaim Plywood, Tuscaloosa, Ala.

Cotton Plant Plywood Co., Cotton Plant, Ark.
Masonite Corp., Warren, Ark.
McKnight Plywood, West Helena, Ark.
Weyerhaeuser Co., West Memphis, Ark.

West Coast Plywood Co., Azusa, Calif.
Louisiana-Pacific Corp., Burney, Calif.
Birchwood of Los Angeles, Inc. City of Commerce, Calif.
Sunset Plywood Inc., Los Angeles, Calif.
Architectural Plywood Inc., North Hollywood, Calif.
Stewart Plywood Co., Santa Fe Springs, Calif.
General Veneer Mfg. Co., South Gate, Calif.
Plywood Mfg. Co. of Calif., Torrance, Calif.

Florida Plywoods, Greenville, Fla.
Jackson Veneer Inc., Laurel Hill, Fla.

Day Plywood Inc., Cuthbert, Ga.
Georgia Plywood Co., Dublin, Ga.
Patat Plywood Corp., Rockmart, Ga.
Bradley Plywood Corp., Savannah, Ga.
Georgia-Pacific Corp., Savannah, Ga.

Sioux Veneer Panel Co., Boise, Idaho
Idaho Veneer Co., Post Falls, Idaho

Anderson Trading Co., Northbrook, Ill.

Jasper Laminates, Jasper, Ind.
Jasper Wood Products Co., Jasper, Ind.
Hoosier Panel Co., New Albany, Ind.
Paramount Plywood Products, New Albany, Ind.

Cumberland Forest Products, London, Ky.
Jefferson Wood Working Co., Louisville, Ky.

Huber Corp., J.M., Patten, Maine

Plycraft Inc., Lawrence, Mass.

Iron Wood Products Corp., Bessemer, Mich.
Davidson Plyforms Inc., Grand Rapids, Mich.
Dodge Veneers Inc., Grand Rapids, Mich.
Plycurves Inc., Grand Rapids, Mich.

Buffalo Veneer & Plywood Co., Buffalo, Minn.
Mill City Plywood Co., Minneapolis, Minn.

Perry County Plywood Co., Beaumont, Miss.
D & L Veneers Inc., Collins, Miss.
Chicago Mill & Lumber Co., Greenville, Miss.
Pavco Industries, Pascagoula, Miss.
Quality Plywood Co. Inc., Waynesboro, Miss.

Keller Products Co., Manchester, N.H.

Yonkers Plywood Mfg. Corp., Old Bridge, N.J.

U.S. Veneer Co. Inc., Bronx, N.Y.
Jamestown Plywood Corp., Jamestown, N.Y.

Doxey Furniture Co., Aberdeen, N.C.
Carolina Plywood Co., Apex, N.C.
Benson Veneer Co., Benson, N.C.
Calypso Plywood Co., Calypso, N.C.
Chowan Veneer Co., Edenton, N.C.
Rankin Bros. Co., Fayetteville, N.C.
Hayworth Roll & Panel Co., High Point, N.C.
Genwove, Indian Trail, N.C.
National Veneer Co., Lenoir, N.C.
Carolina Panel Co., Lexington, N.C.
Hasty Plywood Co., Maxton, N.C.
Laminated Wood Corp., New Bern, N.C.
Columbia Plywood Co., Old Fort, N.C.
Denny Plywood Co., Roseboro, N.C.
Davis Wood Products, Rowland, N.C.
Rural Hall Veneer Co., Rural Hall, N.C.
Statesville Plywood & Veneer, Statesville, N.C.
Columbia Panel Mfg. Co., Thomasville, N.C.
Ingram Plywoods Inc., Thomasville, N.C.
McLeod Plywood Box Co., Wadesboro, N.C.
Weldon Veneer Co., Weldon, N.C.
Whiteville Plywood Co., Whiteville, N.C.
Southern Inc., Wilmington, N.C.
Sperry & Hutchinson Furn. Co., Windsor, N.C.
Beck Bros. Veneer Co., Zebulon, N.C.

Georgia-Pacific Corp., Eugene, Ore.
States Veneer Co., Eugene, Ore.
Southern Oregon Plywood, Grants Pass, Ore.
Columbia Plywood Corp., Klamath Falls, Ore.
Timber Products Co., Medford, Ore.
Louisiana-Pacific Corp., Tillamook, Ore.

Masonite Corp., Watsontown, Pa.

Champion International, Charleston, S.C.
Standard Plywoods Inc., Clinton, S.C.
Furniture Veneers Inc., Conway, S.C.
Stilley Plywood Co., Conway, S.C.
Darlington Veneer & Plywood Co., Darlington, S.C.
Dillon Veneer & Plywood Co., Dillon, S.C.
King Veneer Co., Florence, S.C.
Sumter Veneer Co., Florence, S.C.
Tinsley Plywood Corp., Florence, S.C.
Tyler Plywood Corp., Florence, S.C.
Drexel Heritage Furniture, Kingstree, S.C.
Champion International, Orangeburg, S.C.
Marsh Plywood Corp., Pamplico, S.C.
Georgia-Pacific Corp., Sumter, S.C.
Winnsboro Plywood Inc., Winnsboro, S.C.

Panoply Corp., Lexington, Tenn.
Memphis Plywood Corp., Memphis, Tenn.
Southern Laminating Co., Memphis, Tenn.
Speltz Plywood Corp., Memphis, Tenn.
Tri-State Veneer & Plywood Co., Memphis, Tenn.

Center Plywood Co., Center, Texas
Triangle Pacific Corp., Center, Texas
Champion International, Galveston, Texas

Bradford Veneer & Panel Co., Bradford, Vt.
Weyerhaeuser Co., Hancock, Vt.
Rutland Plywood Corp., Rutland, Vt.

Lane Co. Inc., Altavista, Va.
Atkins Plywood Inc., Atkins, Va.
Burkeville Veneer Co., Burkeville, Va.
Whittle Plywood Corp., Chatham, Va.
Danville Plywood Corp., Danville, Va.
Eastern Door & Panel Corp., Danville, Va.
Multi-Ply Corp., Danville, Va.
Plywood Panels Inc., Norfolk, Va.
Henry County Plywood Corp., Ridgeway, Va.
Lane Co. Inc., Rocky Mount, Va.

Mt. Baker Plywood Inc., Bellingham, Wash.
Champion International, Seattle, Wash.
Buffelen Woodworking Co., Tacoma, Wash.
North Pacific Plywood Inc., Tacoma, Wash.

Allegheny Lumber Co., Elkins, W. Va.

Birchwood Lbr. & Veneer Co., Birchwood, Wis.
Lenderink Inc., Gillett, Wis.
Warvel Products, Gillett, Wis.
Marion Plywood Corp., Marion, Wis.
Weyerhaeuser Co., Marshfield, Wis.
Wisconsin Timber & Land Co., Mattoon, Wis.
Pluswood, Inc., Oshkosh, Wis.
Wisconsin Laminates, Pewaukee, Wis.
Birchwood Mfg. Co., Rice Lake, Wis.
Weber Veneer & Plywood Co., Shawano, Wis.
Lullabye Furniture Co., Stevens Point, Wis.
Eggers Plywood Co., Two Rivers, Wis.

SOFTWOOD PLYWOOD

Company & plants	Capacity*
Georgia-Pacific Corp., Portland, Ore.	
Monticello, Ga.	245
Taylorsville, Miss.	244
Georgia-Pacific Corp. (cont.)	
Fordyce, Ark.	230
Gloster, Miss.	230
Warm Springs, Ga.	215
Louisville, Miss.	215
Crossett, Ark.	202
Georgia-Pacific Corp. (cont.)	
Monroeville, Ala.	200
Crossett, Ark.	198
Talladega, Ala.	190
Whiteville, N.C.	180
Coquille, Ore.	180

* Est. annual capacity (+000,000)

SOFTWOOD PLYWOOD (cont.)

Company & plants	Capacity*
Georgia-Pacific Corp. (cont.)	
Emporia, Va.	180
Russellville, S.C.	175
Logansport, La.	160
Springfield, Ore.	160
Toledo, Ore.	140
Chiefland, Fla.	115
Prosperity, S.C.	115
Champion International, Stamford, Conn.	
Bonner, Mont.	300
Lebanon, Ore.	228
Corrigan, Texas	221
Camden, Texas	198
Roseburg, Ore.	170
Gold Beach, Ore.	150
Newberry, S.C.	150
Hammond, La.	98
Anderson, Calif.	90
Cordova, Ala.	85
Willamina, Ore.	78
Waycross, Ga.	66
Seattle, Wash.	26
Boise Cascade Corp., Boise, Idaho	
Medford, Ore.	250
Elgin, Ore.	154
Chester, S.C.	150
Kettle Falls, Wash.	150
Yakima, Wash.	130
DeQuincy, La.	124
Independence, Ore.	123
Emmett, Idaho	100
White City, Ore.	100
Albany, Ore.	81
Camp Adair, Ore.	81
Valsetz, Ore.	81
Moncure, N.C.	80
Sweet Home, Ore.	60
Willamette Industries, Portland, Ore.	
Dallas, Ore.	150
Foster, Ore.	142
Dodson, La.	113
Zwolle, La.	107
Emerson, Ark.	105
Lebanon, Ore.	105
Springfield, Ore.	96
Philomath, Ore.	84
Lebanon, Ore.	78
Natchitoches, La.	77
Ruston, La.	77
Sweet Home, Ore.	60
Weyerhaeuser Co., Tacoma, Wash.	
North Bend, Ore.	200
Longview, Wash.	
Mountain Pine, Ark.	
Livingston, Ala.	100
Jacksonville, N.C.	100
Plymouth, N.C.	100
Wright City, Okla.	100
Snoqualmie Falls, Wash.	95
Klamath Falls, Ore.	88
Dierks, Ark.	
Springfield, Ore.	85
Cottage Grove, Ore.	80
Philadelphia, Miss.	54
International Paper Co., Dallas, Texas	
Gurdon, Ark.	200
Springhill, La.	200
Wiggins, Miss.	130
International Paper Co. (cont.)	
Nacogdoches, Texas	110
Gardiner, Ore.	90
Roseburg Lumber Co., Roseburg, Ore.	
Dillard, Ore. (2)	320
Riddle, Ore.	260
Coquille, Ore.	125
Roseburg, Ore.	107
Louisiana-Pacific Corp., Portland, Ore.	
Urania, La.	220
New Waverly, Texas	208
Lufkin, Texas	140
Tillamook, Ore.	100
Standard, Calif.	68
Kirby Forest Industries, Houston, Texas	
Bon Weir, Texas	275
Cleveland, Texas	180
Silsbee, Texas	150
Southwest Forest Industries, Phoenix, Ariz.	
Albany, Ore.	185
Grants Pass, Ore.	150
Grants Pass, Ore.	120
White City, Ore.	120
White City, Ore.	110
Potlatch Corp., San Francisco, Calif.	
St. Maries, Idaho	176
Pierce, Idaho	153
Lewiston, Idaho	152
Temple-Eastex, Diboll, Texas	
Pineland, Texas	164
Diboll, Texas	153
Medford Corp., Medford, Ore.	
Medford, Ore.	185
Grants Pass, Ore.	100
Grants Pass, Ore.	96
Vancouver Plywood Co., Florien, La.	
Florien, La.	175
Oakdale, La.	175
Crown Zellerbach Corp., San Francisco, Calif.	
Joyce, La.	208
Omak, Wash.	120
Brand-S Corp., Corvallis, Ore.	
Corvallis, Ore.	108
Springfield, Ore.	105
Corvallis, Ore.	88
Georgia Kraft Co., Madison, Ga.	
Simpson Timber Co., Seattle, Wash.	
Fairhaven, Calif.	100
McCleary, Wash.	100
Albany, Ore.	72
Shelton, Wash.	34
Plum Creek Lumber Co., Columbia Falls, Mont.	
Kalispell, Mont.	120
Columbia Falls, Mont.	110
Bohemia Inc, Eugene, Ore.	
Culp Creek, Ore.	95
Drain, Ore.	85
Junction City, Ore.	80
Kogap Mfg. Co., Medford, Ore.	
Diamond International Corp., Bend, Ore.	
Redmond, Ore.	113
Red Bluff, Calif.	64
Manville Forest Products, Denver, Colo.	
Winnfield, La.	100
Huttig, Ark.	70
Publishers Forest Products Co.,	
Anacortes, Wash.	165
Timber Products Co., Medford, Ore.	
Grants Pass, Ore.	108
White City, Ore.	55
Lane Plywood Co., Eugene, Ore.	162
Robert Dollar Co., Glendale, Ore.	160
Multnomah Ply. Co., St. Helens, Ore.	150
Scotch Ply. Co. of Ala., Fulton, Ala.	150
Ft. Vancouver Ply. Co., Vancouver, Wash.	144
North Santiam Ply. Co., Mill City, Ore.	144
Union Camp Corp., Chapman, Ala.	130
Hardel Mutual Ply. Corp., Olympia, Wash.	120
Stevenson Co-Ply, Stevenson, Wash.	108
Peninsula Ply. Co., Port Angeles, Wash.	103
MacMillan Bloedel Inc., Pine Hill, Ala.	100
Great Southern Plywood Inc.,	
Cedar Springs, Ga.	100
Owens-Illinois Inc., Jasper, Texas	100
Delta Pine Ply. Co., Beaumont, Miss.	100
Fourply Inc., Grants Pass, Ore.	100
South Coast Lbr. Co., Brookings, Ore.	
Anderson Plywood Co., Hines, Ore.	90
Rosboro Lbr. Co., Springfield, Ore.	90
Evans Products Co., Aberdeen, Wash.	90
North Pacific Ply. Inc., Tacoma, Wash.	85
American Forest Prod. Co., Martell, Calif.	84
St. Regis Paper Co., Libby, Mont.	80
Miller Redwood Co., Merlin, Ore.	80
Lang & Gangnes Corp., White City, Ore.	77
TMA Forest Prod. Group, Andalusia, Ala.	72
Warm Springs Forest Products	
Warm Springs, Ore.	72
Alpine Veneers Inc., Portland, Ore.	66
Mt. Baker Ply. Co., Bellingham, Wash.	65
Coast Range Plywood, McMinnville, Ore.	60
Chesapeake Bay Plywood Corp., Pocomoke City, Md.	60
Lacey Plywood Co. Inc., Lacey, Wash.	60
Puget Sound Ply. Inc., Tacoma, Wash.	60
Hoquiam Plywood Co., Hoquiam, Wash.	56
Coos Head Timber Co., Coos Bay, Ore.	42
Pacific Lumber Co., Scotia, Calif.	40
Cloverdale Products Co.,	
Cloverdale, Calif.40	
The Singer Co., Trumann, Ark.	
General Veneer Mfg. Co., South Gate, Calif.	
Sperry & Hutchinson Furniture Co.,	
Windsor, N.C.	
Mt. Jefferson Plywood Co., Salem, Ore.	
Bingen Plywood Co., Bingen, Wash.	
Centralia Ply. & Veneer, Centralia, Wash.	
Elma Plywood Corp., Elma, Wash.	
Textured Forest Products, Washougal, Wash.	
Whitehall Plywood Corp., Whitehall, N.Y.	
Hunt Plywood Co., Pollock, La.	
Coastal Lumber Co., Havana, Fla.	

* Est. annual capacity (+000,000)

PARTICLEBOARD

Company & plants	Capacity*
Weyerhaeuser Co., Tacoma, Wash.	
Klamath Falls, Ore.	100
Springfield, Ore.	100
Adel, Ga.	82
Marshfield, Wis.	65
Broken Bow, Okla.	
North Bend, Ore.	
Louisiana-Pacific Corp., Portland, Ore.	
Arcata, Calif.	160
Corrigan, Texas	105
Urania, La.	100
Missoula, Mont.	100

PARTICLEBOARD (cont.)

Company & plants	Capacity*
Georgia-Pacific Corp., Portland, Ore.	
Russellville, S.C.	108
Vienna, Ga.	105
Crossett, Ark.	95
Taylorsville, Miss.	86
Louisville, Miss.	74
Temple-Eastex, Diboll, Texas	
Diboll, Texas	100
Thomson, Ga.	100
Monroeville, Ala.	100
Champion International, Stamford, Conn.	
Gaylord, Mich.	175
Oxford, Miss.	141
South Boston, Va.	84
Willamette Industries, Portland, Ore.	
Albany, Ore.	171
Bend, Ore.	140
Simsboro, La.	66
Roseburg Lumber Co.,	
Dillard, Ore. (2)	280
Union Camp Corp., Wayne, N.J.	
Chapman, Ala.	100
Franklin, Va.	75
Masonite Corp., Chicago, Ill.	
Waverly, Va.	100
Stuart, Va.	60
Boise Cascade Corp.,	
LaGrande, Ore.	154
Bohemia Inc., Eugene, Ore.	130
American Forest Products Corp.,	
Martell, Calif.	110
Manville Forest Products, Denver, Colo.	
Lillie, La.	100
MacMillan Bloedel, Pine Hill, Ala.	100
Timber Products Co., Medford, Ore.	96
Down River Forest Industries,	
White City, Ore.	75
Kirby Forest Industries,	
Silsbee, Texas	73
Potlatch Corp., San Francisco, Calif.	
Post Falls, Idaho	72
Bemidji, Minn.	
Ponderosa Products, Albuquerque, N.M.	45
Wickes For. Ind., San Diego, Calif.	
Chowchilla, Calif.	37
Hambro Forest Products,	
Crescent City, Calif.	29
Collins Pine Co., Portland, Ore.	
Chester, Calif.	28
Navajo Forest Products,	
Navajo, N.M.	25
Rodman Industries, Marinette, Wis.	24
Broyhill Industries, Lenoir, N.C.	22
The Singer Co., Atlanta, Ga.	
Trumann, Ark.	22
Publishers For. Prod. Oregon City, Ore.	
Philomoth, Ore.	20
Nu-Woods Inc., Lenoir, N.C.	16
Swain Industries, Evanston, Ind.	15
Florida Plywoods, Greenville, Fla.	11
Giles & Kendall, Huntsville, Ala.	10
Jasper American Mfg. Co., Jasper, Ind.	
Henderson, Ky.	9
American Furn. Co., Martinsville, Va.	
Woodcore Inc., Scottsdale, Pa.	
Lane Co., Altavista, Va.	
Williams Lbr. Co., East Edington, Maine	

* Est. annual capacity (+000,000)

HARDBOARD

Company & plants	Capacity*
Masonite Corp., Chicago, Ill.	
Laurel, Miss.	1,850
Ukiah, Calif.	580
Towanda, Pa.	300
Superwood Corp., Duluth, Minn.	
Duluth, Minn.	500
North Little Rock, Ark.	130
Bemidji, Minn.	100
Phillips, Wis.	81
Boise Cascade Corp., Boise, Idaho	
International Falls, Minn.	800
Georgia-Pacific Corp., Portland, Ore.	
Coos Bay, Ore.	265
Jarratt, Va.	231
Conway, N.C.	207
Abitibi-Price, Troy, Mich.	
Alpena, Mich.	450
Roaring River, N.C.	165
Weyerhaeuser Co., Tacoma, Wash.	
Doswell, Va.	315
Klamath Falls, Ore.	195
Broken Bow, Okla.	
Champion International, Stamford, Conn.	
Catawba, S.C.	237
Lebanon, Ore.	116
Hood River, Ore.	88
Temple-Eastex, Diboll, Texas	421
U.S. Gypsum Co., Chicago, Ill.	
Greenville, Miss.	150
Pilot Rock, Ore.	50
Danville, Va.	
Publishers For. Prod., Oregon City, Ore.	
Portland, Ore.	
Sweet Home, Ore.	
Anacortes, Wash.	60
Louisiana-Pacific Corp., Portland, Ore.	
Oroville, Calif.	169
Superior Fiber Products,	
Superior, Wis.	148
Evans Products Co., Portland, Ore.	
Corvallis, Ore.	125
Stimson Lbr. Co., Forest Grove, Ore.	
Scoggin Valley, Ore.	114
Celotex Corp., Tampa, Fla.	
Paris, Tenn.	74

INSULATION BOARD

Company & plants	Capacity*
Armstrong Cork Co., Lancaster, Pa.	
Macon, Ga.	
Gold Bond Building Products,	
Mobile, Ala.	300
U.S. Gypsum Co., Chicago, Ill.	
Lisbon Falls, Maine	120
Pilot Rock, Ore.	100
Greenville, Miss.	45
Danville, Va.	
Celotex Corp., Tampa, Fla.	
Sunbury, Pa.	200
Dubuque, Iowa	130
Owens-Corning Fiberglas, Toledo, Ohio	
Meridian, Miss.	220
Boise Cascade Corp., Boise, Idaho	
International Falls, Minn.	200
Kaiser Gypsum, Oakland, Calif.	
St. Helens, Ore.	150
Temple-Eastex, Diboll, Texas	105

INSULATION BOARD

Company & plants	Capacity*
Weyerhaeuser Co., Tacoma, Wash.	
Broken Bow, Okla	
Heubert Fibreboard,	
Boonville, Mo.	54
Conwed Corp., St. Paul, Minn.	
Cloquet, Minn.	
Homosote, Trenton, N.J.	

MDF

Company & plants	Capacity*
Masonite Corp., Chicago, Ill.	
Towanda, Pa.	
Spring Hope, N.C.	
Georgia-Pacific Corp., Portland, Ore.	
Holly Hill, S.C.	75
Weyerhaeuser Co., Tacoma, Wash.	
Broken Bow, Okla.	
Moncure, N.C.	65
Louisiana-Pacific Corp., Portland, Ore.	
Eufaula, Ala.	60
Rocklin, Calif.	60
Celotex Corp., Tampa, Fla.	
Marion, S.C.	70
Deposit, N.Y.	40
Medford Corp.,	
Medford, Ore.	90
Plum Creek Lumber Co.,	
Columbia Falls, Mont.	80
ANNOUNCED:	
Frontier Fiber, Las Vegas,	
N.M.	72

THIN PANELBOARD

Company & plants	Capacity*
Georgia-Pacific Corp., Portland, Ore.	
Monticello, Ga.	320
Whiteville, N.C.	196
Taylorsville, Miss.	44
Superwood Corp.,	
Duluth, Minn.	85
Pluswood Inc.,	
Oshkosh, Wis.	72
Celotex Corp., Tampa, Fla.	
Deposit, N.Y.	30

WAFERBOARD

Company & plants	Capacity*
Georgia-Pacific Corp., Portland, Ore.	
Woodland, Maine	166
Louisiana-Pacific Corp., Portland, Ore.	
Hayward, Wis.	260
Houlton, Maine	120
Blandin Wood Prod., Grand Rapids, Minn.	
Northwood Panelboard,	
Grand Rapids, Minn.	100
ANNOUNCED:	
Huber Corp., J.M., Easton, Maine	130

COMPOSITE BOARD

Company & plants	Capacity*
Georgia-Pacific Corp., Portland, Ore.	
Dudley, N.C.	200
Potlatch Corp., San Francisco, Calif.	
Lewiston, Idaho	
Bemidji, Minn.	150
Cook, Minn.	150
Elmendorf Board Corp., Claremont, N.H.	100
Plyboard, Brownsville, Ore.	90
Ellingson Timber Co., Baker, Ore.	

Directory of Panel Plants—Canada

SOFTWOOD PLYWOOD

Company & plants	Capacity*
Weldwood of Canada Ltd., Vancouver, B.C.	
Vancouver, B.C.	185
Quesnel, B.C.	145
Surrey, B.C.	130
Williams Lake, B.C.	120
100 Mile House, B.C.	115
Longlac, Ont.	55
Crown Zellerbach Canada, Vancouver, B.C.	
Armstrong, B.C.	135
New Westminster, B.C.	130
Kelowna, B.C.	85
Canadian Forest Products, Vancouver, B.C.	
New Westminster, B.C.	223
Grand Prairie, Alta.	80
MacMillan Bloedel Ltd., Vancouver, B.C.	
Port Alberni, B.C.	183
Vancouver, B.C.	120
B.C. Forest Products, Vancouver, B.C.	
Victoria, B.C.	125
New Westminster, B.C.	90
Evans Products Co., Kamloops, B.C.	
Golden, B.C.	120
Savona, B.C.	36
Richmond Plywood Corp.	
Richmond, B.C.	175
North Central Plywoods Ltd.	
Prince George, B.C.	150
Zeidler Forest Industries,	
Edmonton, Alta.	105
Balco Industries Ltd., Kamloops, B.C.	100
St. Croix Pulp & Paper, McAdam, N.B.	100
Kootenay Forest Products,	
Nelson, B.C.	90
Cantree Plywood Corp.,	
New Westminster, B.C.	90
Saskatchewan Forest Products,	
Hudson Bay,	
Sask.	72
Federated Cooperatives Ltd.,	
Canoe, B.C.	64
Victoria Plywood Ltd.,	
Victoria, B.C.	60
Crestbrook Forest Industries	
Ft. McLeod, Alta.	
Normick Inc., Cochrane, Ont.	15
Silvaplex Ltd., Gravenhurst, Ont.	4
Lesage Pianos Ltd.,	
Ste. Therese, Que.	0.3

MDF

Company & plants	Capacity*
Waferboard Corp.,	
Timmins, Ont.	7.2

HARDWOOD PLYWOOD

Company & plants	Capacity*
Weldwood of Canada, Surrey, B.C.	
Newfoundland Hardwoods Ltd.,	
St. Johns, Nfld.	4.5
Levesque Plywood Ltd., Hearst, Ont.	55
Normick Inc., Cochrane, Ont.	50
MacMillan Bloedel, Nipigon, Ont.	35
Vicply Inc., Coboconck, Ont.	25
Canwood Lachute, Orillia, Ont.	7
Curvplywood Products, Orono, Ont.	4
Silvaplex Ltd., Gravenhurst, Ont.	2
Roti Wood Products, Fergus, Ont.	
Commonwealth Plywood Co.,	
Ste. Therese, Que.	72
Normick Inc., LaSarre, Que.	45
Bellerive Veneer & Plywood,	
Mont Laurier, Que.	24
St. Casimir Veneers & Plywood,	
St. Casimir, Que.	12
Les Entreprises V.M.H.,	
Victoriaville, Que.	3
Dominion Shuttle Co., St. Andrews, Que.	
Lesage Pianos Ltd., Ste. Therese, Que.	

HARDBOARD

Company & plants	Capacity*
Masonite Canada Ltd.	
East Point River, N.S.	
Gatineau, Que.	
Canadian Forest Products,	
New Westminster,	
B.C.	180
MacMillan Bloedel Ltd.,	
Sturgeon Falls,	
Ont.	140
Ladysmith Forest Products,	
Ladysmith, B.C.	

INSULATION BOARD

Company & plants	Capacity*
Building Products of Canada	
Point Rouge, Que.	125
Wabamun, Alta.	54
Nordfibre Co., North Bay, Ont.	130
Domtar Construction Materials,	
Donnaconna, Que.	110
Masonite Canada Ltd.,	
Gatineau, Que.	
Stramit Corp. Ltd., Innisfail, Alta.	

* Est. annual capacity (÷000,000)

PARTICLEBOARD

Company & plants	Capacity*
Quebec Hardwoods Inc., Thurso, Ont.	
Sogefor Ltd., Lac des Iles, Que.	60
Pluswood Mfg. Ltd., Atikokan, Ont.	55
MacMillan Bloedel Ltd.,	
Vancouver, B.C.	54
Domtar Construction Materials,	
Huntsville, Ont.	50
Levesque Plywoods Ltd., Hearst, Ont.	50
Rexwood Prod. Ltd., New Liskeard, Ont.	35
Flake Board Co. Ltd., St. Stephen, N.B.	30
Parta Industries Ltd., Grand Forks, B.C.	30
Maillette Lumber Inc., Timmins, Ont.	10
Waferboard Corp., Timmins, Ont.	5

WAFERBOARD

Company & plants	Capacity*
MacMillan Bloedel Ltd.	
Hudson Bay, Sask.	95
Thunder Bay, Ont.	80
Weldwood of Canada Ltd.,	
Longlac, Ont.	100
Slave Lake, Alta.	
Alberta Aspen Board Ltd.,	
Slave Lake,	
Alta.	100
Northwood Pulp & Timber Ltd.,	
Chatham, N.B.	100
Waferboard Corp., Timmins, Ont.	80
Great Lakes Forest Products,	
Thunder Bay, Ont.	76
Normick Perron, LaSarre, Que.	50
Silvaplex Ltd., Gravenhurst, Ont.	

THIN PANELBOARD

Company & plants	Capacity*
Pluswood Manufacturing Ltd.,	
Atikokan, Ont.	200
Flake Board Co. Ltd.,	
St. Stephen, N.B.	45

COMPOSITE PANEL

Company & plants	Capacity*
Domtar Construction Materials,	
Huntsville, Ont.	19.5
Silvaplex Ltd.,	
Gravenhurst, Ont.	1